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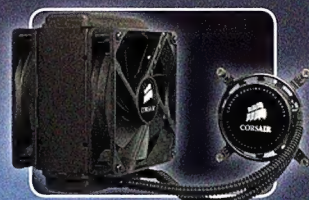
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# EDHEAD

## Milestone

Have a little look-see at the issue number for a moment, and get ready to do some math. See, this is our 120th issue. When you consider that we do 12 issues a year, and divide that 120 by 12, you end up with ten.

Know what that means?

It means this issue marks the completion of what we like to call... THE ATOMIC DECADE. In other words, sweet zombie jesus, we've been going for ten years! Ten years of overclocking, modding, gaming and getting to the heart of the PCs we love so much. Ten years of Atomic online, of one of the most vibrant and active communities you'll see anywhere. Ten years of news,

reviews and in-depth features that have proven Atomic, I hope, to be one of the greatest enthusiast computing titles in the world.

And what that ten years also heralds is the beginning of an unprecedented year of celebrations.

Next year is going to be packed. It kicks off with our next issue, which will have a special collector's cover and some nostalgic Atomic articles. From there, we're ramping up to a year jammed with events – game launches and LAN nights (both in our soon to be redesigned HQ and in some pretty schmick themed venues), hardware forums, and a metric Atomi-tonne more.

Not to mention a very special birthday party... keep an eye out for that one.

There'll be some special subs offers, too, to reward our long-term fans and supporters, and wealth of competitions and unique giveaways to reward the folks who we absolutely could not have gotten this far without – you, the readers.

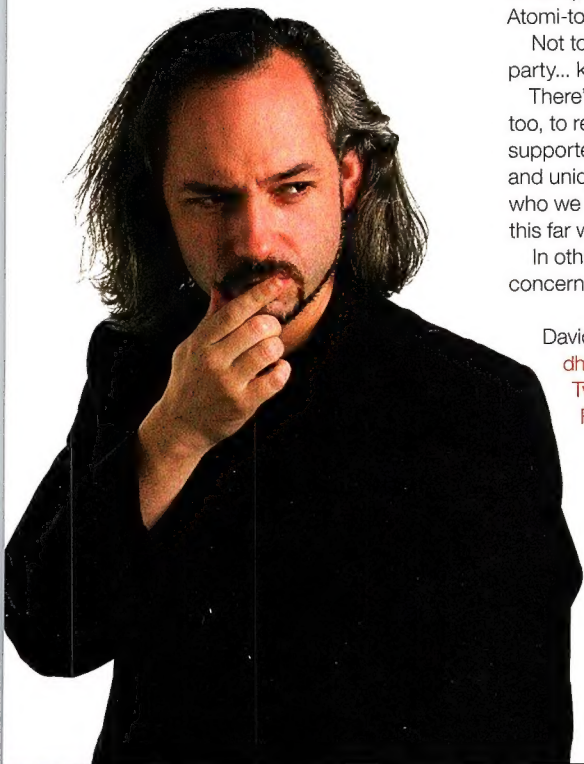
In other words, big fun times for all concerned. Can't wait to get into it!

David Hollingworth

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# 120

ISSUE





# ISSUE 120



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# Merry Christmas! Bethesda announce DLC for Fallout: New Vegas



Get the skinny, the dope, and 411 on the latest DLC news for one of the hottest games of the year.

We've made no secret of our fondness for *Fallout: New Vegas* around these parts. It just missed out on a Hot Award in our last issue, but that was mostly because of some buggy graphics and some less-than-stellar voice work. Most of the greater Atomic team have been playing it since it came out and enjoying it rather muchly – and each in our own way. The storytelling is so open that we're all getting something slightly different from the experience, which is quite an impressive feat.

Plus it's set in post-apocalyptic Las Vegas, so it looks awesome.

Bethesda, the game's publishers, aren't content with resting on their laurels though, and so today they've announced the first downloadable content for the game. Win!

Dead Money has you teaming up with three other wastelanders after a deal goes bad, trying to keep yourselves out of strife (read: alive) for long enough to recover the treasure of the infamous Sierra Madre Casino. You come up against some new enemies and, as ever, Bethesda leave it up to you as to how you're going to get around the obstacles they're putting in your way.

PC and PS3 readers probably don't want to hear this next bit, but *Dead Money* will be released exclusively on Xbox LIVE. It's set to drop on December 21st – which very neatly happens to be the day Atomic goes on holidays – so if you have also been bitten by the F:NV bug and you're one of the chosen Xbox few, you're going to have a very merry Christmas indeed.

## MSY heads to Federal Court over Consumer Warranty Rights

We've a small, but interesting, update on the whole MSY/ACCC warranty issue. But there's more court time to come...

After being taken to Federal Court for various dodgy practices (<http://www.atomicmpc.com.au/?237155>) by the ACCC, online and bricks and mortar retailer MSY and its related companies have given undertakings to the court that they will 'not make false or misleading representations regarding the statutory warranty rights of consumers in future.

The retailer is known among the tech community for their low prices and less-than-stellar service, and the ACCC didn't hold

back earlier this month, alleging a number of warranty rights violations in advertising, online and in-store – all in breach of the Trade Practices Act. The ACC is after 'injunctions, civil penalties, corrective advertising, costs' and, for the longer term, implementation of a strict 'trade practices compliance program'; which would be good news for future customers, at least.

The case goes back to the courts in Early December (ie, now), and we'll be keeping our eyes on the outcome.

## FROM ATOMIC ONLINE

It's been another typically eclectic month of posting, responding, considering, debating, philosophy, helping and all kinds of general cleverness. But, as always, there can only be one... And this month, that one... the one who wins our hearts and a tasty Razer Imperator mouse is none other than...

**DonutKing**, for treating us to a deliciously nostalgic retro romp  
<http://forums.atomicmpc.com.au/index.php?showtopic=37693>

And our honourable mentions are:

**Brock** putting the moves on the social aspects of gaming.  
<http://forums.atomicmpc.com.au/index.php?showtopic=37304&st=0&p=748127&#entry748127>

The **Bushido and Chivalry** thread gets us to get our gear on, and go mental - mentally medieval! Kudos to all involved.  
<http://forums.atomicmpc.com.au/index.php?showtopic=37669>

**superfireyadave**, for taking the SSCariness out of CSS and web design.  
<http://forums.atomicmpc.com.au/index.php?showtopic=37541>

Bravo one and all! Now give them the pat on the back (we're all out of clap this month) they so richly deserve!





# MODIFICATION

with Ashton "Mars is amazing" Mills

## Hexen: Edge of chaos

Game Doom 3

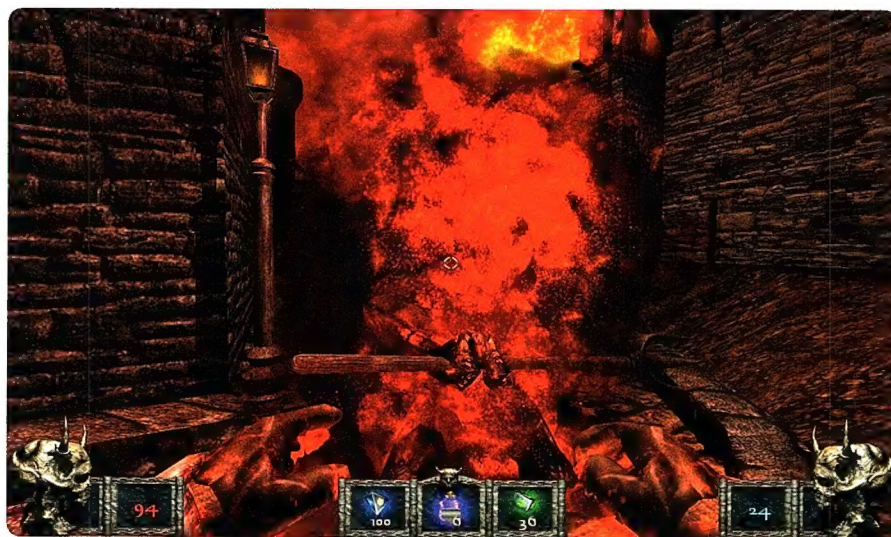
URL [www.hexenmod.com](http://www.hexenmod.com)

**S**toic fans may remember that one year after id software released DOOM, Heretic made its way to our PCs. Developed by Raven software, and using the DOOM engine, it became almost as popular as its forebear. Such popularity resulted in two sequels, Hexen and Hexen II, based on modified DOOM and Quake engines respectively.

And that was that, until now. A band of enterprising modders (and, as you might guess, hardcore fans of the series) have spent the last four years re-creating the Hexen experience using the spiffy DOOM 3 engine.

And it's a faithful re-creation, honouring the Hexen atmosphere with its mood and brooding descent into darkness, all while wielding a decidedly dastardly collection of weapons.

Hexen: Edge of Chaos is set after the events of Hexen 2 and features all classic weapons and inventory items, ported across from Hexen but now rendered in 3D glory. There are classes of fighter, mage and cleric – as in the original – but this time the plan is to have the player play each one of these in three installments of the



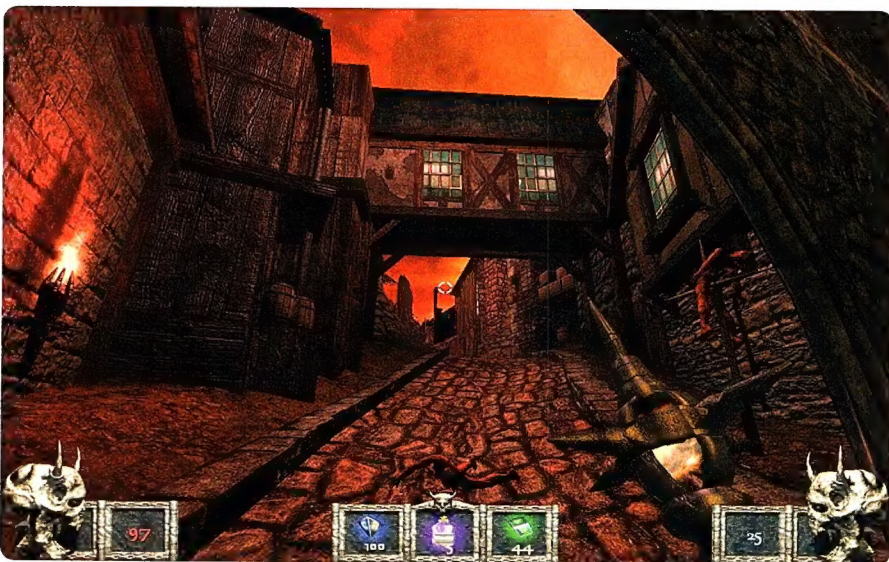
mod, and the first one has just been released.

One new element is the Journals, which can be found as you explore; these are the equivalent of DOOM 3's PDAs, and used as a tool to divulge part of the story line (beyond what you need to know – kill everything in your path, like most standard FPS faire).

The current release is being called a demo, but it's quite complete and very playable. There are a few bugs and some criticisms of certain puzzles being too hard, but these issues are already in the process of being addressed. On the whole, considering the enormous amount of work that went into it, it's a very clean release by the group.

As an added bonus, Hexen: EoC works just as well with the native DOOM 3 Linux client as with the Windows version. The download is 607mb and needs, of course, DOOM 3 installed with patch 1.3.1.

If you have fond memories of the Heretic and Hexen games, you don't want to miss this mod. (E)

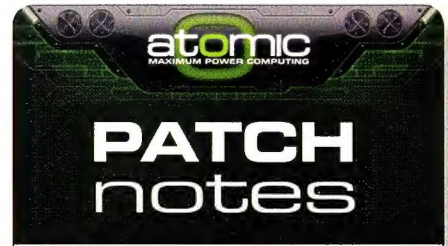




# 1187

Game Half Life 2

URL [www.wix.com/jourev/1187](http://www.wix.com/jourev/1187)



Men of War Patch v1.17.5

World of Warcraft Patch v4.0.1 to v4.0.1a

Starcraft 2 Patch v1.1.3

DCS: A-10C Warthog Patch Beta 2

F1 2010 Patch v1.01

Borderlands Patch v1.4.1

DEFCON Patch v1.46

Medal of Honor Patch R7

Total Annihilation Units  
Compilation Pack v2.3

Battlefield Bad Company 2 Patch R9



Also four years in the making and recently released, Eleventy Eighty Seven is set soon after the Black Mesa event, with portal storms wrecking havoc across the land. You find yourself cut off from your girlfriend in another city, waking up from a strange dream where G-man made an appearance. Your mission: get out of the city and find your girl!

But even getting out of your apartment block presents some problems. This is perhaps one of the criticisms of the mod; it's a bit hard (I had trouble getting out of the apartment block!), and it's not always clear where you need to go next – though this has been addressed already in some of the post-release patches. If you like a challenge, 1187 brings it.

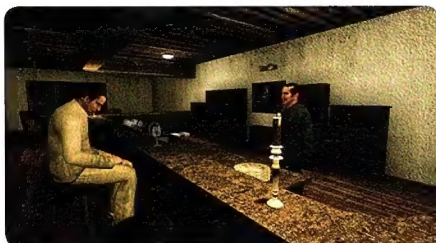
There's a lot of atmosphere, too; dark corridors and flicking lights make it even harder to deal with hordes of headcrab zombies rampaging towards you, especially when you find yourself down to the last bullet in your pistol. A number of weapons come with a torch, but not all, so you have to pick and choose your arms wisely.

The mod brings with it some unique enemies – including armoured zombies – and an interesting plot that sees you joining up with companions and fighting off everything from Vortigons to military aircraft. There's a crash-course included to introduce you to some of the gameplay features that are unique to the mod, and some competent voice acting as well.

Oh, and you can drive cars! Fast, sporty cars at that. And this is part of the charm – you don't feel like some powered up super hero with an HEV suit and loads of weapons at your disposal. It's a survival mod and you make it through with whatever you can find.

1187 clocks in at 1.2gb and, as is the way, releasing to the mainstream often reveals bugs or other issues; within two weeks three patches had been released, so make sure grab at least version 1.3 or higher.

There are plenty of single-player mods for Source out there, and while 1187 is not up there with the best, it only just falls short, and is still definitely worth your time. Play it with the lights off, and keep a spare set of pants handy. (5)





# GEARBOX

All the coolest gadgets & gear.

## Panasonic Lumix DMC-GF2

**Price:** TBC **Website:** [www.panasonic.com.au](http://www.panasonic.com.au)

Most of us here in Ye Olde Atomic Office are quite into photography, and more than one of us has been known to take a DSLR out with us on a big night in order to capture some high-quality 'happy snaps' (read: blackmail material).

Panasonic has noted this with interest, observing how much of a pain it is lugging around a full-size DSLR in the hopes of catching your friends doing something regrettable, and have decided to help us out by releasing the Lumix GF2. It weighs about half a beer, and while we wouldn't exactly call it pocket-perfect, it is pretty small and party-friendly.

On the technical side, you get 12.1 million pixels to play with and can shoot 1080p video – for those times when stills are just not going to truly capture the humiliation. There's also the usual built-in flash, image stabilization and a fully customizable touch-screen menu, which includes a touch-focus function, perfect for when you're a little tipsy. The result: plenty of high-res, in-focus shots sure to help you get ahead in the world.

And before you ask: yes, there's also a 3D lens available.



## Creative Sound Blaster World of Warcraft Gaming Headset

**Price:** \$249.95 **Website:** [www.soundblaster.com](http://www.soundblaster.com)

There's a teeny little cynical part of us that wonders why anyone needs a gaming headset with bright red (or blue, if you prefer) World of Warcraft-themed lights over the earcups.

... not that we'd ever voice such a question aloud though, for fear of being whacked upside the head by any WoW fan.

With good reason, probably. Cynicism aside, these may be a bit of fun, aesthetically, but they're also quite comfortable and powerful, equipped, as they are, with Creative's THX TruStudio Pro audio technology – a bit of a sonic superbeast capable of restoring quality lost to compression, delivering 360 degree sound, enhancing in-game voices for clearer dialogue, evening out sudden shifts in volume and producing heart-thumping bass. And we thought we knew how to multitask ...

Plus, they're WoW themed, and so obviously awesome. Right?



## Silicon Power Armor A80

**Price:** TBA

**Website:** [www.silicon-power.com](http://www.silicon-power.com)

Some people are really careful with their tech. The rest of us... well, we're likely to chuck a portable hard drive into the bottom of our backpacks. And then go out drinking. In the rain.

Which is why the Armor A80 exists.

According to Silicon Power's research, the Armor A80 will work perfectly after being submerged in water for half an hour, being dropped from a great height, or living under your bed in the dust for months. Slob win!



## Sony Mini Muteki

**Price: \$349 Website: [www.sony.com.au](http://www.sony.com.au)**

Most iPod docks are vaguely flimsy, cute little things that produce enough sound to get you through the day but lack the power you need for those big musical occasions. Don't be fooled by the 'mini' in the name – this does not fit into the 'puny sound' category. What is it is a 'mini' version of the Sony Muteki home theatre system – a monster of a thing with two subwoofers and six monstrous speakers.

The Mini Muteki is more modest, but still outputs 220 watts of constant power. It also has big chunky handles for lugging it around – a bonus, given that at 12.5kg, it's on the very edge of portable. The one thing we're not sure about are the coloured LED lights which sync to the music: fun in theory, but this beast looks enough like a slightly creepy staring robot without them, especially late at night in a darkened room...



## Samsung HT-C9950W 3D Home Theatre System

**Price: \$2,399 Website: [www.samsung.com.au](http://www.samsung.com.au)**

Opinion may be divided on whether the all-in-one kit is the best way to approach home theatre, especially if you want a system you can upgrade as time goes on, but it is hard to go past the shiny shiny stylings of this particular system. From the futuristic lectern that also functions as 3D Blu-Ray player and amp, to the clean, monolithic subwoofer, it's all designed to within an inch of its life to look (and sound) seriously cool.

And as if playing Blu-Ray, DVD, and CD and acting as an iPod dock isn't enough, it also has the internet! The HT-C9950W comes with a wireless adapter which enables it to play nice with your home network, giving you access to Samsung Apps. And that means YouTube and Twitter and Facebook on your TV and, presumably, blasting out your 7+1 speakers. Twitter: The Musical, anyone?







# The real truth about tablet computing

Has the day of the tablet finally arrived? **Jake Carroll** investigates.

**A**s computing people, generally, we tend to be sceptical and cynical of innovations. Strange, because oftentimes we are the innovators. Regardless, it's hard to downplay social and cultural trends within technology. Social networking mania is rife, as is the concept of tablet computing. Yes, it's been tried before, and has failed miserably. This month, we're going to be pinching, zooming and gesturing to answer the ultimate question.

Are tablets actually worth it yet?

## Well, duh

'No!' cry the masses. Hold up a minute, however. Sales are booming and Apple's marketing machine has once again made us all think twice. Love 'em or hate 'em, Apple has again made users want something they didn't want a year earlier. Could any other company have done this? Maybe. Could they have executed it with such finesse? Probably not. Even for the most hardened Apple-hater, it's naïve to suggest that the iPad did not spur on many new tablet solutions. With the plethora of Google Android-based tablets such as the Galaxy Tab leaking from the guttering, and RIM's Playbook showing up, there is bound to be some confusion, overlap and differentiation between them.

## Tablets in the elder days

The idea behind tablets has been around for a long time. Long enough that many people reading this article might be too young to remember. A tablet is designed as a complete computer contained in an entirely flat, touch sensitive screen that uses a stylus, wand, pen or fingertip as the primary device for control. The term 'tablet' was derived from the resemblance to the ancient stone writing tool.

The first tablet was demonstrated in 1954. Known as the Styalator Electronic tablet, it had a pen and computer interface. The tablet could recognise handwriting in real time. Not long after that, the more popular RAND tablet was shipped to market.



The RAND tablet.

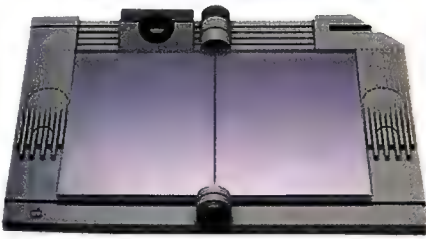


The Pencept system, allowing common hardware to be used for the first time with a highly advanced pen-like interface.

The 1960s didn't do much for tablets. At this particular epoch, technology was not progressing sufficiently to develop any major changes in interfaces that anyone would actually find useful. The 1970s and '80s rolled in, and technologies such as Pencept came about that leveraged 'IBM Compatible'-based computers, enabling what was considered the most robust hand writing recognition algorithms for the day.

In 1987 Apple demonstrated several concept videos explaining the Knowledge Navigator. Internal Apple mock-ups even made it to the public domain. The device had a touch sensitive screen, with a web camera inside and gestural, or 'multi-touch', capabilities implicit on the surface. Not for another 20 years would a real life device bring such technology to the end user, beyond the engineering room floor.





**The Knowledge Navigator by Apple.**

In the early 1990s the Apple Newton entered development. Destined to end up as a PDA that never quite lived up to the artist's conceptions, it ultimately failed in the marketplace. The Apple Newton was a massive step in technology however, if only because OS development was really starting to accelerate. The NewtonOS platform ran primarily on ARM 610 based RISC processors.

NewtonOS and its associated development platform did some revolutionary things. Using a scripting language (NewtonScript), developers were able to harness complex concepts such as on the fly garbage collection, a full UI-toolkit and some parallel processing capabilities.

The NewtonOS consisted of three layers. Interestingly, this was a theme that would continue throughout the life of Apple's operating systems, all the way to Mac OS X 10.7 (Lion). At the lowest level, a microkernel (such as Mac OS's xnu) handled resources such as scheduling and memory. On top of the microkernel lived the bulk of the OS, implemented in C++. Atop this lived the NewtonScript environment.

Sales slowed. An inability to meet goals such as 'reinventing personal computing' and a growing fear inside the company that the Newton itself would interfere with the sales of Macintosh computers spelt doom for the platform in 1997. The Newton was killed off. Flying years ahead, Steve Jobs made a comment at a press conference in 2004 to the effect that a new "Apple PDA" taking form "where the Newton left off". This would lead to the eventual development of iOS.

Meanwhile, Microsoft's Bill Gates stepped



**The HP Tablet PC was one of the first systems to run Windows XP Tablet Edition.**



**A Newton platform device sitting next to an iPhone, both running the Notes application.**

onto the floor of COMDEX 2001 and showed the world a public prototype of the Tablet PC. It ran Windows XP Tablet Edition.

At that point, things kind of froze over. People lost interest, tablets stopped selling and everyone became disenchanted. This was as a result of clunky navigation, lack of true gestural capabilities, ill-adapted operating system accommodation and poor sensitivity in screen response. And so... it all felt flat.

In 2003, FingerWorks developed a touch sensitive gesture-based technology that could be considered a precursor to the iPhone. FingerWorks was ahead of its time, and the company knew it. Again, a market was never really realised because of the niche appeal and cost. At \$US1500+ for a TouchStreamLP touch sensitive keyboard, it wasn't a viable proposition for the mass market. Apple quietly purchased the company in early 2005.

Another three years of 'meh' floated by. Samsung developed a notable entry into the market in the form of the Q1 UMPC. The unit was part of the Microsoft Origami project. It was a generic x86 CPU, running on Windows XP Embedded. Possibly a sign of things to come, having a wireless NIC, Bluetooth, a 1GHz processor and upgradeable RAM.

In 2008 the ModBook was shown at Macworld. Effectively just a MacBook, hacked up to act as a tablet, it was the first and only Apple platform as a full computer to also act as a tablet. Problematically, it was still just a computer being used with a pen or pointing device. It wasn't necessarily engineered for easy access, nor were human interface design considerations entered into.

HP came to the party with the TouchSmart tx2. Unfortunately, the execution of 'multi-touch' was poor and unresponsive; it had loud cooling fans; and was effectively the same weight as a

bloated laptop. 2009 was similarly uneventful, the only notable product being the ASUS tablet netbook in the form of the ASUS EEE PC T91MT. Similarly to the HP TouchSmart tx2, multi touch made it harder to use, rather than easier.

When 2010 rolled around, things changed plenty. The Apple iPad hit to impressive sales. The Samsung Galaxy Tab, Android-based tablet hit. RIM pushed out the Playbook. Dell pushed out the Streak. Neofonie busted out the WeTab and Fusion Garage gave us the Linux based JooJoo. Tablets became as popular as peanuts.

## Everything changed?

If the marketing is anything to go by, the whole world changed since the release of Apple's iPad. So, for the time being, the energy and buzz around tablets is back – primarily due to Apple.





## Inside the iPad.

### Hardware

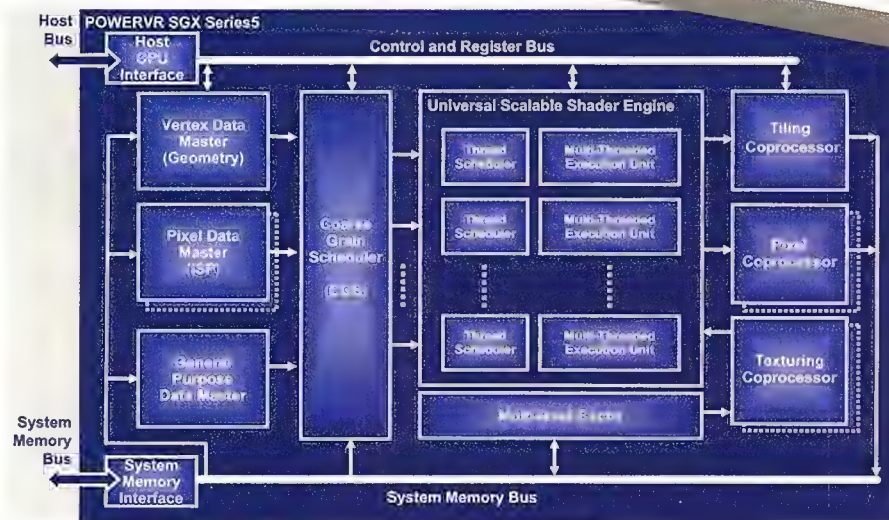
One of the most talked about aspects of the iPad is the CPU. A Samsung-fabricated ARM-designed master-stroke, known as the A4. A common processing trend in the industry at the moment, the A4 is a complete compute platform solution known as a SoC, or System-on-a-Chip. The ARM-based CPU integrates a PowerVR SGX 535 GPU and a 1GHz Cortex-A8 CPU. The unit is a full 64-bit floating-point precision CPU.

We decided to dig around inside the iPad's architecture paths to see what the A4 was hiding in terms of processor capabilities. We were able to do this by Jailbreaking the unit (something that is exceptionally easy to do, but that Mr. Jobs would prefer you didn't), installing an OpenSSH daemon on it, then SSH-ing in over the network to have a poke around the kernel.

What does that actually mean? For starters, it suggests to us that despite being a 64-bit word path from CPU to everywhere else on the system, it's actually a 32-bit OS sitting on top. Arguably, the usability of the iPad comes from the simplicity of the multi-touch interface. This tablet uses a capacitive sensor (<http://en.wikipedia.org/wiki/Capacitance#Self-capacitance>). There are plenty of electrical layers underneath the tough oleophobic glass coating that enables, what appears to be, a seamless software/hardware interaction.

### Software

In a typical multi-touch or gestural interaction, the screen registers a series of touch points, which are then fed directly to the CPU. At the CPU, size, shape, direction and location of the touch point or pixel-matrix is measured and fed through a post-processing phase. A software command to achieve a task is then carried out. The finesse of the product doesn't come from looking cool. It comes from the processing



The PowerVR SGX Series 5 GPU diagram, found in the Galaxy Tab and the iPad.

power of the Cortex-A8. It is the interpretation of multiple capacitive points, and fast feedback that creates the convincingly fluid user experience.

Powering the display is a GPU that is used in several of Intel's integrated GMA solutions. The PowerVR chipset is capable of OpenGL 2.0, and Direct X 9/10.1 instructions. It also supports Shader Model 3.0. But no, it doesn't run *Crysis*.

## A one horse race?

There are plenty of 'me too!' tablets being thrown around the market. We became curious when we were told that Samsung had an iPad-killer in the works. Sure enough – the Samsung Galaxy Tab (GT-P1000) has, on the surface, a few new technologies that make it a differentiator in this already crowded market. What did we find?

## So hang on. Is this the iPad in a smaller case?

When we looked into the block diagrams of the Galaxy Tab, we found some pretty interesting components.

1. It's using an ARM Cortex-A8, just like the iPad.
2. It's using a PowerVR SGX 540 GPU, just like the iPad.
3. It uses a touch sensitive panel, using a combination of capacitive and self-capacitive hardware, just like the iPad.

However:

1. It's about 200 grams lighter than the iPad.
2. It's got a camera on the front.
3. It has external storage connectivity options.
4. It has a base band GSM/Cellular modem that

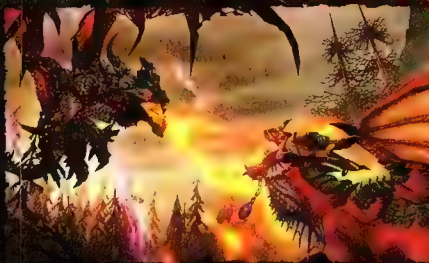


The Apple A4 SoC processor.



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BATTLE AS WORGEN OR GOBLIN



CONQUER THE ELEMENTAL PLANES

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**BILZARD**  
ENTERTAINMENT



can make phone calls.

5. It has a gyroscopic microelectromechanical systems sensor (MEMS).

## The Galaxy Tab, in more depth

Several individuals have torn the Galaxy Tab apart in an effort to understand the hardware costs and justifications underneath. The overwhelming wholesale cost difference comes from display technology differences.

### Hardware

The Samsung device uses a 1024 x 600, TFT-based screen. It is not the AMOLED-based screen found in its little brother, the Galaxy S. The iPad uses an IPS based 9.4 inch 1024 x 768 display, using LED backlighting.

As many are aware, John Carmack of iD Software recently demonstrated the iD Tech 5 engine running on the PowerVR chipset found inside the iPhone/Galaxy Tab. 60 FPS, full megatextures and shader model 3.0 in real time, were all demonstrated.

### Android OS

In 2005, Google acquired Android Inc, who was the creator of the Android OS. Things moved quickly from there, to eventuate in 2007 with a marketable product. By November 2007, Android OS had turned into:

- Java applications, running on a Java based runtime environment.
- The Dalvik virtual machine.
- Core libraries written in pure C.
- SQLite for database management and in-phone metadata collection.
- OpenGL ES 2.0 API's for tie-in to the PowerVR GPU capabilities.
- WebKit layout engine for browser rendering.

Android is exemplified by open standards components. Equally, any developer can pick up a copy of XCode for free from Apple and pay for a dev key for their iOS device.

## Got root?

With applications like Limera1n around to jailbreak and pop on Cydia in under 60 seconds, the iPad is hack-friendly. Samsung's 'Kies', coupled with a third party tool to write a root apk, will have you running around with low level filesystem access in minutes. Both Apple and Samsung suggest that it will void your warranty.



It isn't illegal, but nor does it have any irreversible effects if carried out with caution and sensible research. As to whether it's a worthwhile undertaking – it's probably best to figure out what you're trying to achieve first. Root-level access has the major advantage of running unsigned code. We will leave you to determine the useful nature of this, for your own needs.

## The real differences?

We aren't going to tell you that either device is better. They behave differently and suit different lifestyles and modalities of usage. When it comes down to it, the hardware is embarrassingly similar between the two. In our experience, thus far we can say this:

1. Apple's iOS has an edge on UI design and human computer interaction intelligence. Numerous situations crop up when using the Android OS where one is left wondering what to click, or there are multiple points of exit and entry on a device that confuse the user. Commands are simplified on iOS, where the only option is the obvious one. On Android OS, we see arrows that do the same thing as buttons, which will achieve inconsistent outcomes at times. An

example of this is the 'back' button on the Galaxy Tab unit. In many situations, there is an alternative on screen, but it might have a slightly different behaviour or effect than simply pushing the physical button.

2. Google's Android has an edge on out of the box flexibility. One can at least perform system performance inspection on the Galaxy Tab! To do this on an iPad, we needed to jailbreak the unit, then run some third party GNU tools to even acquire a useful SSHd and Shell. Android lets you play freely.

3. Price to component value ratio. The Galaxy Tab is said to retail for \$999 outright in Australia. It's net worth in components is around ~\$250. The top of the line iPad retails for ~\$1050. It's net worth in components is around ~\$390. Make of this what you will.

So how do we see this playing out? We believe it's a war of software efficiencies, momentum, marketing and nothing more. Apple has the shine, the cult and the momentum, but Google has the heart and the ethos. Tablets are indeed worth owning, as of this moment. Technology has put us into a good place.



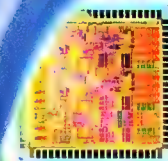




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# INPUTOUTPUT

Dan Rutter brings the answers to your questions like no-one else can.

## I/O OF THE MONTH

### The Flash-RAM anti-TARDIS

**I** I made a foolish impulse bid or two on eBay the other week, and soon became the proud owner of two 32GB SDHC memory cards for around \$24 each, with free postage. They arrived in my hands a short time later; I opened the package... but something didn't seem quite right. In fact the only thing running through my mind was that I had bought counterfeit chips. Shouldn't there be some sort of cardboard packaging saying how fantastic it is? Why is there an air bubble underneath the sticker? How can the sticker claim this to be 'Class 6' (the highest class) when it looks terribly boring (it's not shiny!)?

I ran off to Google and found that 'h2testw' was the weapon of choice in testing whether an SD card was fake or not, and the results of course confirmed it was. Curse that seller's 99.2 per cent positive feedback! The test reported '1.9 GByte OK 29.0 GByte DATA LOST' among other things.

I am wondering how they managed to trick the operating system into thinking a 1.9GB card is 32GB? Is this something I could do as a cool party trick? Could I 'upgrade' the family's old 40GB hard drive to 1TB?

James Anglely

**O** It's quite easy, with the right firmware-burning software, to tell a memory card or USB stick to report a much higher capacity than it actually has. This is the way this irritatingly common scam always works. The card or thumb drive really does have some memory on it, and the real memory is at the 'front' of the device, the first to be filled.

So, at first, these devices seem to work, and the scam artist responsible gets good eBay feedback (though they often fold up their eBay/PayPal accounts and steal away into the night if you file a dispute).

Unless, of course, the buyer is suspicious like you and runs a testing program, or just manually fills the device with data and then sees if it's possible to read all of it back (you only need to test the *last* file you copied...).

## I/O OTM

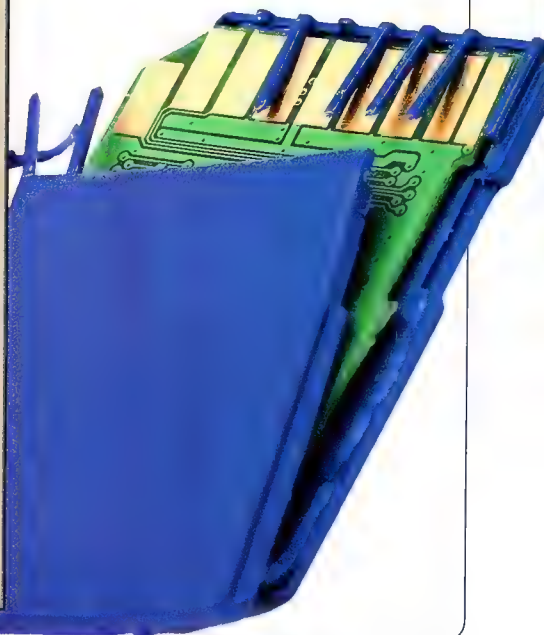
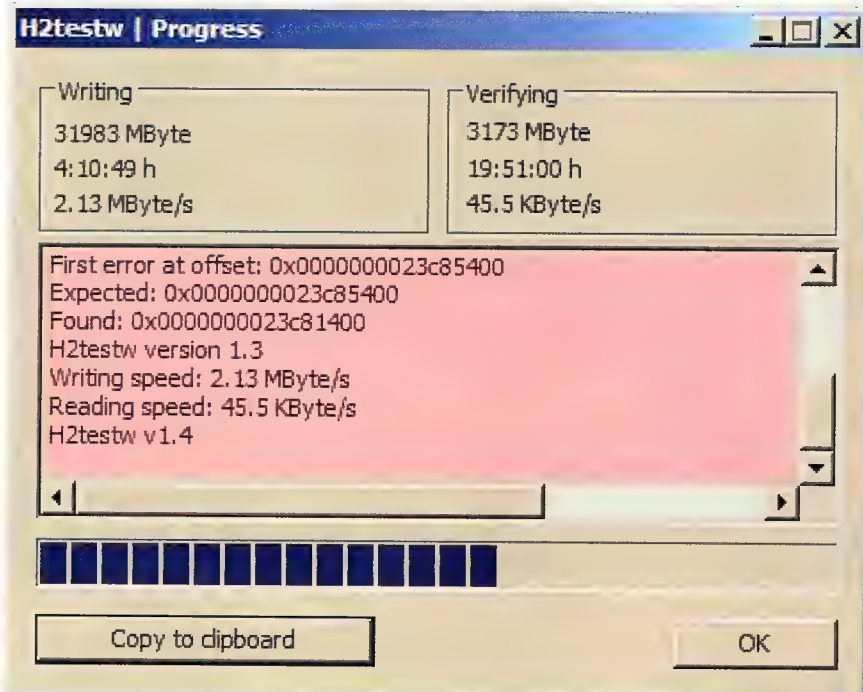


WINS A THERMALTAKE CHALLENGER PRO KEYBOARD

Then the subterfuge becomes apparent.

It's theoretically possible to re-flash the firmware to only report the real capacity and thus get some use out of the thing, but in practice you probably won't be able to do it.

And yes, it's possible to do similar tricks with all sorts of other storage devices. Just as it's possible to make a Zip file that will try to expand into countless hyperbytes of data, it is also possible to make a hard drive with more apparent capacity than Google, or indeed a floppy disk with more capacity than the NCC-1701E's computer. This trick was used as a (rather weak) copy-protection technique, back in the floppy-disk days.







## The Diamond (Heatsink) Age

**I** The precariousness of the diamond 'market' is well-known among internet types, however a crash hasn't happened as predicted in this fascinating old (1982) article: [bit.ly/diamondmarket](http://bit.ly/diamondmarket)

Nor have high-pressure high-temperature synthesis and chemical vapour deposition diamonds had much impact on the general public's idea of the worth of diamonds.

Do you think there will ever be a diamond crash? Will we ever see the fabled diamond heatsink? Would we even want one? I imagine they would be pretty difficult to manufacture practically.

Alex Roberts

**O** Diamond does indeed have very high thermal conductivity. Super-pure synthetic diamond can beat the thermal conductivity of copper (silver's only around 20 per cent better than copper) by at least a factor of ten, and possibly a lot more.

And, as that *Atlantic* article explains, the major players in the diamond market have kept diamond prices artificially high for a very long time, by restricting supply and by strangling the second-hand market. Artificial diamond technologies have been advancing steadily – it's been possible to make small industrial diamonds inexpensively in large quantities for a long time. But artificial diamonds haven't had much of an effect on the gem market yet.

The demand for cheap gem diamonds is smaller than you might think, too, because of *non*-diamond artificial gems – today usually cubic zirconia (cubic-crystalline zirconium dioxide, or CZ) and clear silicon carbide, a.k.a. 'moissanite'.

These fake diamonds look great, and are already quite cheap to make (very cheap, in the case of CZ). While CZ is a lousy thermal conductor, moissanite is a very good one, and has already been used for heat-transfer in chip packages.

(So, by the way, have several composites that mix diamond dust into metal alloys. Their conductivity is much lower than plain diamond, but their composition can be fine-tuned so it matches the thermal expansion of the chip materials they're bonded to.)

You shouldn't expect to see an actual diamond heat sink – as opposed to some sort of diamond heat *spreader* inside or on top of a chip package – of any significant size for a long time. Possibly never. You'd need to be making really huge synthetic diamonds to be able to carve 'em into something even the size of a northbridge-chip cooler, and I don't think anybody knows how to make 'em that big yet.

Diamond is also very difficult to *shape*, because it's so very hard, and also brittle. To minimise the shaping problem, you'd want to make your original synthetic diamond lump as close as possible to the shape of whatever the final product is going to be. In the case of a finned heatsink, this would probably be extremely difficult.

As I said the last time I wrote about this ([www.dansdata.com/io076.htm#4](http://www.dansdata.com/io076.htm#4)), there are several industries that have a use for big artificial diamond lumps – like people making 'anvils' for ultra-high-pressure science, for instance. Those industries are willing to pay a very great deal more than heat-sink prices for big diamonds.

So unless someone *does* come up with an inexpensive process for making tennis-ball-sized diamonds in bulk, you shouldn't expect to ever see a diamond heat sink.

## Another bug hunt

**I** One day, not so very long ago, I turned on my monitor to find no picture. As the computer was still sharing files on the network, the monitor worked fine with my laptop, and the standard fix-it technique of any computer user (restarting) didn't change anything. I thought it was probably a faulty (PCIe) video card. I turned the computer off, and requested a replacement.

A few days later, I tried turning the computer on (without a video card) to access a file on a network share, only to hear continual long beeps from the PC speaker. The manual suggested that this meant faulty

memory, so I made a new diagnosis: faulty northbridge. A few days later, a replacement motherboard arrived. I plugged the CPU, RAM, and video card back in, turned the power on, and again, no picture and continual long beeps. I replaced the memory with two new sticks, and tried again. This time, while there was still no picture, the computer booted and showed up on the network. So, after using some moderately offensive language, I requested replacement RAM and I bought a new video card (since there was a month-long wait to get the old card replaced).

I left the computer running headless while I awaited the replacement parts. Of course, the PC was not to be treated in such a blatantly disrespectful way, and so it shut itself down one night. When I tried to restart it, I was relieved not to hear any POST error beeps. Not so happy not to hear any POST success beep – the CPU fan turned on, but the PC now refused to boot at all. Even removing the memory entirely couldn't convince it to signal any errors. So, resigned to my fate, I bought a new CPU (a Core 2 Duo 7400), which arrived today. I plugged it in, along with the new video card and new RAM... with no change. Still no picture, still no POST beep, still nothing.

So here, at last, is my question: WTF? Could the source of all these problems be the PSU (a 520W Corsair modular unit, and the only component which hasn't been replaced in the last month), or am I unlucky enough to have got a bad replacement for the motherboard? Or, as I am beginning to suspect, am I missing something completely bloody obvious?

Craig Rayner

**O** Yes, the PSU would be my first guess, given pretty much any cluster of bizarre symptoms like these. Hardware does peculiar things when it doesn't get enough volts. And, as I've written many times, a spare PSU is a good thing to have on the shelf anyway, so there's not much lost if the PSU turns out to *not* be the problem.

If swapping in a new PSU doesn't help, my next step would be to look for electrical weirdness inside the case. Are there, for instance, any motherboard standoffs accidentally installed in places where there is not actually a hole through the motherboard? Also look for loose screws, loose change, metal washers, eggbeaters, sporks, crowbars et cetera that may have fallen into the works. And make sure all of the cooling fans can spin, and that the heat sinks aren't clogged with dust. Also make sure all heat sinks are *properly installed*, and haven't come loose. A stone-cold heat sink is one that probably isn't making proper thermal contact with the thing it's meant to be cooling.

It is also possible that one or more components of the PC have been static-zapped before, or during, your attempts to rectify the problem. (Many totally mystifying PC problems are like this; there's something wrong with Component X, but in the process of replacing it Component Y gets half-toasted, and now the hapless user thinks the replacement X has something wrong with it...)

Just talismanically touching the computer chassis while working is a good enough anti-static precaution 95 per cent of the time, but it's very cheap to do it properly with an anti-static wrist strap.

## Stop cursing during prime time

**I** When I change the volume on my Windows XP laptop (shut up, it works), I get a DEAFENING beep. Stupidly loud. I'm afraid that it's hurting the tiny speakers. I could swear it even did it once when the audio was muted.

I've updated the audio drivers, I've removed the sound adapter and redetected it, I've sacrificed a goat, nothing works. Is this God telling me to upgrade?

Cai Cheng

**O** Maybe, but you can ignore Him.

Go to Device Manager, View menu, 'Show Hidden Devices', and under 'Non-Plug and Play Drivers' you'll find 'Beep'. That's the old 'PC speaker' error/notification beep, which is being redirected to your audio device at maximum volume.

Disable Beep, and the outrageous noise will be silenced. 





**Y**ou may have seen that video on YouTube with the Cuba mission in Call of Duty: Black Ops, where the player walks through the whole level on Hard without firing a shot, and yet still completes the level – thanks to his companions, and scripted events. The point? The player has become a spectator. It's true, too, that for some games, the scripted and linear nature of the gameplay leaves them as little more than barely interactive button mashers, with little skill or challenge involved. Is it really 'playing' anymore if you don't really need to do anything to win?

Unfortunately we've seen this more and more in recent releases, especially with FPSes,


the giant Fisher-Price console interface.

So while PC gamers may lament the way games have changed in recent years thanks to consoles, it's not going to change anytime soon. At least not in the way we might think.

For the PC has something up its sleeve. One of the reasons consoles work so well, beyond their simplicity in setup and in play, is that they are standardised. It makes developing a lot easier, as programmers don't have to deal with a myriad of hardware devices, operating systems, and drivers.

But that strength, that static nature, also makes them stagnant. Seen any DX11 consoles

of the latest PC hardware, consoles are going to look over with jealous eyes and want some of that action. At that time we'll probably get a refresh of the consoles, because the hardware that goes into PCs today will go into the consoles of tomorrow. But until then, the PC is getting the attention, and games are increasingly going to be developed with it in mind. Console games will be moving back to becoming ports of the PC version, not the other way around as it predominantly is today.

So yes the quality and design of games has been heavily influenced by the popularity of consoles – but rejoice PC gamers, the tide is turning. 

**Compared to PCs, consoles have incredibly limited processing power and small video memory footprints that further limit them.**

but the truth is that's not a bad thing – for their intended audience. Today, consoles are the base platform and when you consider the size of the market, it's just simply good business. And, it's an unfortunate by-product of the market that console gamers are by and large casual gamers. Casual gaming is pick up, put down, no strings attached. Like the shows on the TVs on which they are usually played, casual gaming is often about switching off, not straining the brain.

So yes, in many ways we've been seeing games become more dumbed down, for want of a better phrase. Multiple paths to completing a mission and free-form exploration of the type we saw in Crysis is being swapped out for scripted, confined, linear gameplay. Even RPG hybrids like Fallout 3 have suffered as a result – Fallout: NV comes with 'Hardcore' mode after Fallout 3 was lambasted for being a walk in the park even on Hard, a result of keeping its console cadre happy (though even this is wimpy and needed modding) – and let's not mention

recently? What about DX10? The Xbox hasn't changed, internally, in five years and the PS3 in almost as long. But your PC has. This says nothing of hardware accelerated physics effects, and high-quality textures. Compared to PCs, consoles today have incredibly limited processing power and small video memory footprints that further limit them.

And since it is the games themselves that stretch the boundaries of what's possible, that are first to take advantage of new hardware innovations, it is right about now that the PC is having a renaissance. Can you get Metro 2033 on the Xbox? Sure thing. Does it look as good as the PC version? Nope. And that gap is growing wider by the year. Given time, the Xbox 360 and PS3 will look like a Nintendo DS compared to the PC. Remember what it was that turned all your Amiga-loving friends to the PC all those years ago? DOOM. It didn't just look amazing for the time, there was nothing else like it. As developers push the boundaries

See? It's not all about Linux...

[amills@atomicmpc.com.au](mailto:amills@atomicmpc.com.au)

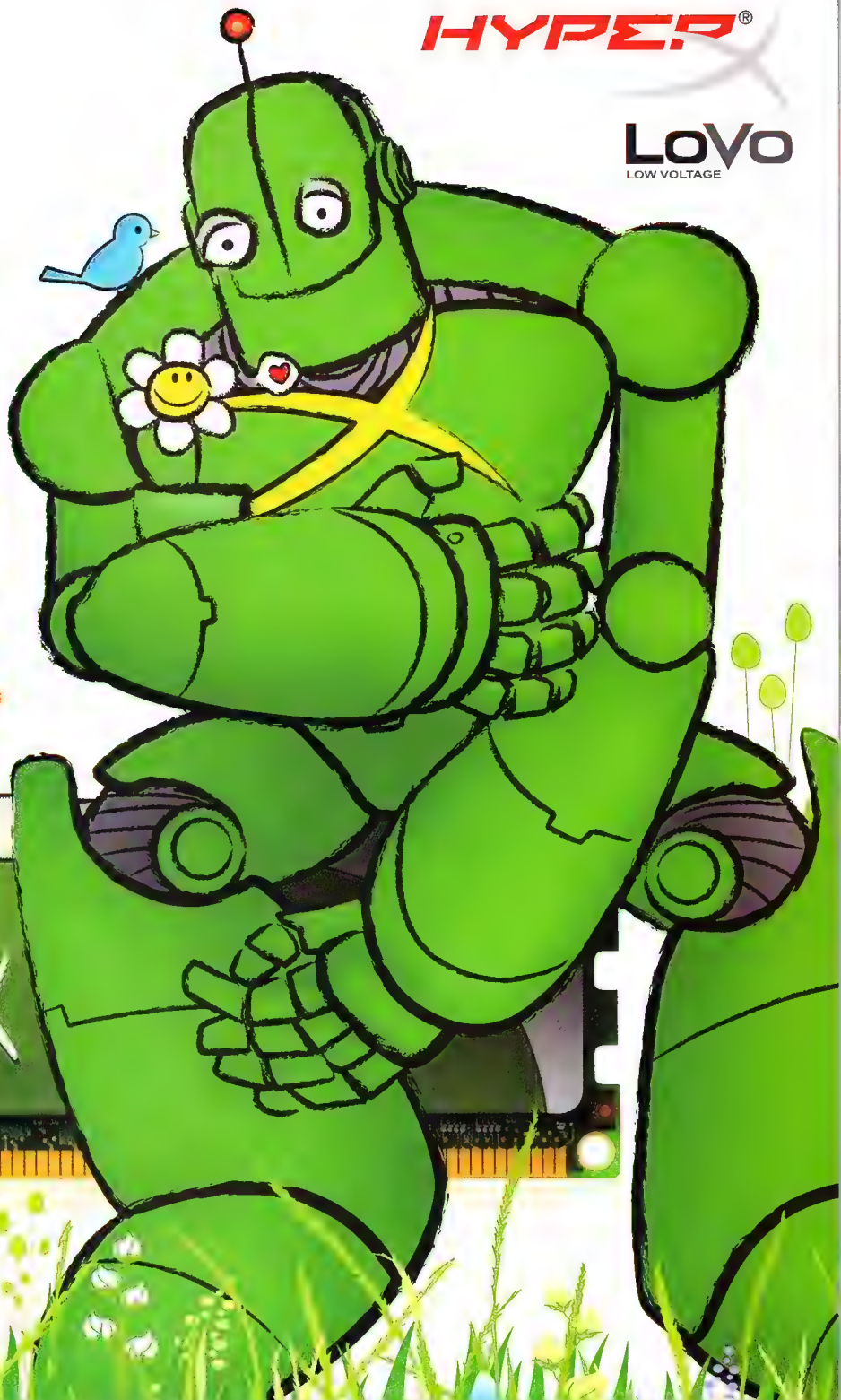




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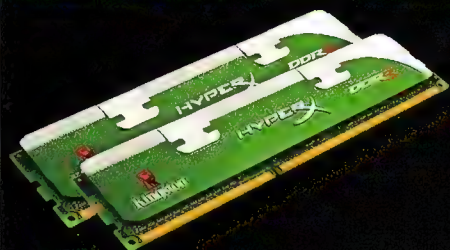
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# atomic

## GAME OF THE YEAR AWARDS

The most demanding gamers in Australia have voted on their favourite games of the year – time to see who won, who lost, and how it stacks up on the last 12 months of reviews in Atomic. Brought to you by **David Hollingworth**

**Y**ear's end. Typically, it's a time of Xmas parties, hearty well-wishes for the year ahead, and drinking waaaay more than is normally healthy for you or those around you. It's also the time of year when we in the industry look back at the year just gone and try to make some sense out of the crazy rush of issues, online stories, and marathon gaming sessions.

In other words, it's time for our GAME OF THE YEAR AWARDS!

So that's what we're doing. We hosted a poll on our site – [www.atomicmpc.com.au](http://www.atomicmpc.com.au), if you've not been paying attention – asking our lovely readers to tell us about their favourite games of the last 12 months. First person shooters, strategy and racing games, RPGs, MMOs... it's all there, and more beside.

Now, the truth is that nearly every gaming man and their dog gets in on the Game of the Year shenanigans, but we think we've got a truly unique angle on it – Atomic has

always had a far more discerning audience, and a more mature one, than many similar titles, so you know this list will be, if not entirely free of fanboism, at least not too influenced by it.

We're also taking the opportunity to look back at our own last year of reviews. Speaking of fanboys, we're aware that we can, at times, fall prey to hype and expectation, so now's a good time to reflect on the scores of the last year of games to see what we stand by and what we regret. It's also a good opportunity to get see just how close our opinions are to those of our readers, and in that regard our GotY Awards will be a good calibration tool for the next 12 months worth of games.

But, more than anything, it's a chance to celebrate gaming – a lot of responders felt this was a bad year for games, but we've rarely felt so spoilt for choice no matter what style of game we've been wanting to play. So, without further ado, let's see who walks away with a coveted top spot...









# atomic

## GAME OF THE YEAR AWARDS

### FIRST/THIRD PERSON SHOOTER



The humble shoot-em-up is still the hottest genre of game amongst Atomicans... but what's the hottest shooter of them all?

**W**e've often thought it a truism – that there's no finer way to pass time than staring down the sites of precision tool of destruction and mayhem, pwning noobs and racking up kills. And it seems we're not alone; of all the categories of game we asked Atomicans to vote on, the shooter received far and away the most love and attention.

#### 5. Fallout: New Vegas

So here's a funny thing – someone's put an RPG in my shooter list! Even funnier is the fact that if you look a few pages ahead, you'll see FNV scored well on the RPG part of our survey, too. But we're going to let that stand, because the game's simply that good.

So what does it offer as a shooter? Heaps.

Sur, there's all this RPG-stuff to get through – talking, inventory management, and skills to worry about – but what really matters are the guns. And shooting those guns at one of the widest arrays of badguys you'll see in any game. Not to mention shooting them in the head and getting glorious slow-motion shots of exploding heads and separating limbs.

In other words, good, clean fun! And that's just looking at it out of the box – there are a lot of mods around that make the game an even more focused shooter, by changing the way ironsights work or removing the VATS aiming system altogether. And the game's vast open world also makes for a great shooting gallery,



with all kinds of environments to gun random folks down in.

Damn. Every time we talk about New Vegas, we just want to go play it... give us a moment...

#### 4. Medal of Honor

Given all of the negative reports we've seen of this game on our forums, we're surprised to see Medal of Honor make the top five – but when you think about it, it deserves the spot.

We scored MoH a rating of 75 per cent, and we stand by that. The game's singleplayer campaign was singularly disappointing, but the truth is we're still addicted to the gritty and

highly tactical multiplayer portion of the game – we're predicting this is exactly what's earned the game it's, well... honor.

It's an impressive feat, given how packed the military shooter market is. Three out of the five games on this list are tactical shooters, and MoH's managed to carve out its own niche. MoH delivers a much more focused and intimate gaming experience than similar games; each map channels the action in such a way that it never feels forced, but is still remarkably compact.

Now if only the singleplayer experience could be tweaked to match...

#### 3. Halo Reach

We're very glad to see this game make the cut. As we unashamedly said in our review, this is one of those rare games that delivers a huge emotional wallop to match its incredible action. It's the final game that Bungie, the developers who built the franchise, will be working on, and is a fitting farewell to the series.

Being the only console-only title to make any of our lists is a true testament to Halo's popularity. We tend to be a pretty PC-centric crowd in these parts, but Reach deserves the props. It's a finely polished game that not only improves upon its predecessors, but still manages to give us the gameplay we know and love. Aside from the singleplayer campaign – still one of our own great gaming moments of the year – there's also the incredibly deep







multiplayer offering. From the wide range of game modes to the incredible powerful Forgeworld level design tool, this is definitely a game that's going to keep on giving for years to come.

But we could do with a little less tea-bagging.

## 2. Call of Duty: Modern Warfare 2

Okay, is anyone really surprised to see Modern Warfare 2 show up? Is anyone really surprised to learn that even though this poll

was conducted *before* the release of the follow up, Black Ops, that that game still got a lot of votes? It seems that some fan's faith in the game was so complete they were happy to declare it Game of the Year sight unseen.

Impressive.

But we're talking MW2 here, a game that, despite delivering a vastly underwhelming PC experience, has still made the cut. We have to admit, when we reviewed the game we gave it a score of 70, saying "Sadly, very much not the game we were hoping for six months ago."

But that didn't stop us from playing a lot of it. The truth is that the Modern Warfare formula is very addictive – the constant promise of new unlocks, from weapons to perks, keeps players coming back for more, and it's a trick that looks to be even more ramped up in Black Ops.

In all honesty, there's nothing quite like the action that MW2 delivers – whether you love it or hate it you have to admit that.

# WHAT YOU SAID

## Bad Company 2

"Game play and State of the art tactical destruction that defines online warfare."

"Great multiplayer and singleplayer. Destructable environments and all round great graphics made for a realistic yet very enjoyable game."

## Modern Warfare 2

"Despite being screwed over with infinity ward net, call of duty still delivers the best online multiplayer with hardcore mode."

## Fallout: New Vegas

"Really brings to life exactly what I thought the wastelands would be like post-nuclear war. Hardcore is the only way to play this game."

## Halo Reach

"Slick as hell."

## Medal of Honor

"Epic game, that's way more realistic than MW2 and MW black ops."


## WINNER: Battlefield Bad Company 2

Here's a great example of what a bit of love can get you. We really disliked Bad Company 2 on release, calling it one of the worst launches of the year. Not only was the singleplayer game underwhelming, but the multiplayer portion was supremely poor. Bad server integration, an excruciatingly bad UI, and a mess of lag and other issues had us literally fuming.

But EA and developer DICE stuck by the game, delivering a series of patches that culminated in a major update... and suddenly, it was *on*.

Since then, BC2 has had a permanent

place on our hard drive, and we've maxed out two of the four classes in the game, and are working on a third. We've destroyed countless buildings, downed an endless stream of helicopters, and likely circled the earth a dozen times on the back of madly charging ATVs.

And to say we're excited about the impending release of Bad Company 2: Vietnam is a massive understatement. We're glad the community agrees, too, as they voted this game not only the best FPS release of the year, but also the second best game over all. A worthy winner, indeed. 



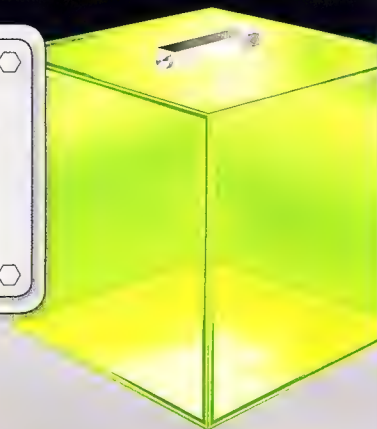




# atomic

## GAME OF THE YEAR AWARDS

# STRATEGY



Ah... the fine art of moving little dudes around a virtual landscape. But which little dudes and/or beasts were this year's best?



**W**e've got to admit, we might have chosen an odd year to get these Awards off the ground. Because, when you think about it, only one game was ever going to walk away with the big prize in terms of strategy offerings in 2010. But let's suspend our disbelief and imagine that any game might come out on top.

### 5. Supreme Commander 2

Our review opinion of this game was that it was good enough, but not quite the epic game we were hoping for. Scoring at respectable 79 per cent, we thought it was a mere "A fun enough experience" – damning with faint praise, we admit.

However, that's not kept it from making an impression on gamers, and scraping into this list. That said, SupComm2 and the next title are a very distant fifth and fourth respectively.

Oddly, one of the things that you, our readers, seem to have liked about the game is that it just deliver more of the same. There were many comments about how close it was to the original, or how it rated purely because of the franchise or even loyalty to the game's designers. Odd, given that it was the perceived changes to the game that turned us off it.

Which just goes to show the challenges in reviewing, we guess.

### 4. Dawn of War 2: Chaos Rising

There's an argument to be made that an expansion shouldn't really make it into a Game of the Year list, but that would be doing the genius of the Dawn of War franchise, and Relic Games' approach to it, a massive injustice.

First up, Chaos Rising adds in one of the most identifiable of Warhammer 40k factions –

the Chaos Marines. Hulking, power armoured adherents to debased Gods, these guys put the bad in badarsery. Secondly, it's the same great Dawn of War gameplay we've always loved, with the same loving attention paid to the universe that has made us love the franchise from day one.

But what really makes Dawn of War expansions so great, is that they are playable without the initial game. So you get a campaign, and access to the Chaos Marines in multiplayer, for an expansion box price – and it just works.

Very generous, Relic, and no doubt a big part of the series' over all success.

### 3. Napoleon: Total War

Later this issue you can suss out our impressions of a preview build of the latest Total War game, Shogun 2 (hint: shiny!), but you need to understand that many months after it's release, we still come back to awesomely impressive Napoleon.

Some detractors claim it should be an expansion to Empire, not a game in its own right – we understand what they mean, but we disagree. The change in warfare heralded by the dawn of the Napoleonic age calls for a complete game in its own right, and that's exactly what this is – it's a faster, more muscular version of the larger epic that is Empire.

Covering only about 20 years, the game nonetheless packs in a lot of fighting on land and sea.

Combined with arguably the best graphics engine of any strategy game, it's a mighty achievement. We called it in our review, when we scored the game with a massive 99 per cent. Incidentally... a point more than our strategy winner. Personally, we stand by that, but we're not too surprised Napoleon has placed where it has.

### 2. Civilization V

Any other year, there's a good chance Civ V would kick this whole Game of the Year thing out of the damn park. Not this year, though it has come in a respectable second.

There's been some grousing that Civ V didn't quite deliver on its promise, but it's pretty obvious that those disappointed in the fifth





# WHAT YOU SAID



game (not counting expansions) are in the minority. Everyone else has put their gold where their mouth is and pushed Civ way up close to the very top of the build queue.

But the truth is that Civ V continues the franchise's wonderful trend of adding

complexity while removing any barriers to entry for series newcomers. The new leader AI, the addition of City States, combined with changes to combat and map drawing all add up to a wholly new way to experience the hyper-addiction that is Sid Meier's trademark.

## WINNER: Starcraft 2: Wings of Liberty

And here it is – the 200-pound gorilla in the mist that no one can ignore. It's highly likely that no matter what year that Starcraft 2 was finally released, it would still walk away with GotY honours. It could go up against a game that lets you download cocaine and comes with free hookers, and still would likely win the most votes.

However, the fact is that it is arguably one of the most polished games we've ever played, beautifully balanced and challenging in multiplayer, and with a singleplayer story

crafted to deliver action, emotion and humour by turns.

Sure, it is far from perfect – the decision to ditch LAN play, the lack of advanced graphics options, and other minor niggles do leave a bad taste in our mouths, but at the end of the day this is a product from a company that is continuing to reach the zenith of its craft.

What we'll be very curious about, is whether the next two games in the series can match Wings of Liberty. Only time will tell on that one...

### Civilization V

"All-encompassing, addictive, not-too-difficult, not-to-easy. A thinking persons' game."

### DoW2: Chaos Rising

"Dawn of war, brilliance, and Chaos? Spoonfuls of epic win."

### Napoleon: Total War

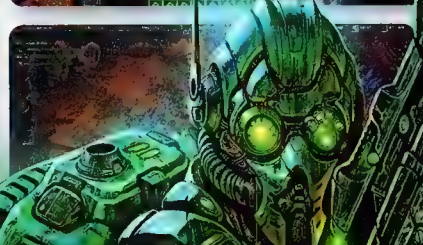
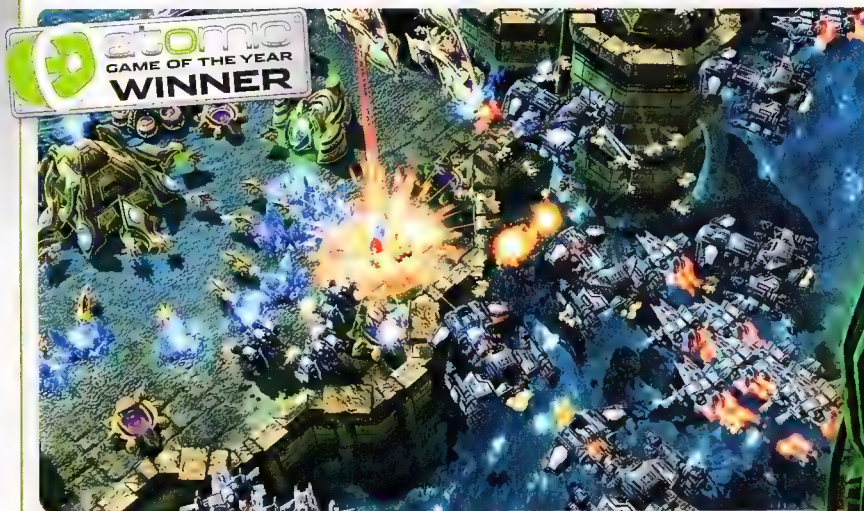
"I play this in Eyefinity and its just too much fun. Multiplayer is the best."

### Starcraft 2

"It's Starcraft what more do you have to say, how many years have we waited for it..."

### Supreme Commander 2

"They kept the best thing from the first game (zoom in and out on field of vision)."







# atomic

## GAME OF THE YEAR AWARDS

### MMOs

Because playing with yourself is boring when you can play with thousands of men pretending to be teen girls.

Okay, this is a tough one, and likely controversial. MMOs are a truly special case when it comes to rankings like this one. If you only count a single 12-month period, you could end up with a short list, not to mention do a disservice to those older MMOs that manage to keep their content up-to-date and patched.

But if you include older MMOs... it could be argued that it's a foregone conclusion.

At the end of the day, though, we consider an MMO an ongoing proposition, a genre of games that need constant development work to keep them going. With that in mind, we've opened this field wide open. So without further ado...

## 5. EVE Online

There's a common joke amongst gamers that if all you want is an accountancy package with a fancy GUI, then EVE is the game for you. It's famous for being ultra-involved, complex, and at times rather dry in its pursuit of representing

a living, breathing galactic economy.

Yet, for all its detractors, this is a game that people tend to love for exactly those reasons. The detailed economic modelling combined with stunning ship graphics makes for a truly unique gaming – though it could be argued it's more of a sim – experience.

## 4. Aion

Considering we're allowing games more than a year old to compete in this one – and given the votes such games have received, it's obviously what you want too – it's doubly impressive to see a game like Aion get a nod. This anime-inspired, angelic MMO was only released this year, but for many people it's their top choice for massively multiplayer fun.

It's not a game that grabbed us, but then we're kind of set in our ways with MMOs. But the gorgeous graphics and clever use of flight mechanics in the game's combat have won over a lot of players.

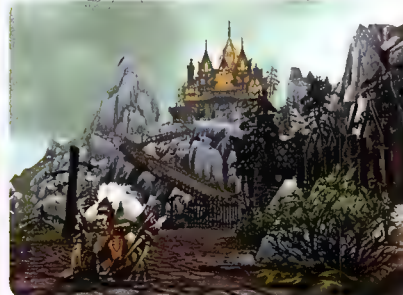
## 3. Lord of the Rings Online

Now we're talking – this is by far our favourite MMO of all time, and there's no better time for folks to give it a try. This year, it moved from a subscription model to a free-to-play one, and it's picked up a mess of players, handily refreshing server pops across the board.

But more than that, it's a wonderful exercise in storytelling, integrating player quest lines alongside the larger story of the books – that is, the Quest for Mount Doom. Combined with some of the best graphics on PC today, and arguably the most mature player base to date, it all adds up to a compelling online experience most games will never be able to match.



## WINNER: World of Warcraft



Okay, it's no huge surprise, but to be perfectly honest... Blizzard deserves this win. Few games get as much unswerving and obsessive attention lavished on them. World of Warcraft is blessed with constant patches and content updates, a vibrant community, and a rich and ever expanding world in which to adventure.

Sure, Blizzard can drop the ball occasionally – like with this year's real name forum debacle – but they always pick it up again. There's a reason that WoW has so many millions of subscribers.

It's just that good a game, and it's constantly getting better, too. Anyway... back to leveling before Cataclysm comes out!

## 2. Star Trek Online

Controversy!

A lot of players – passionate Trekkies or just those looking for an alternate to fantasy MMOs – really wanted to like STO. And a lot of them didn't. There was a huge backlash against developer Cryptic, for undelivered promises in game mechanics and half finished quest arcs... but for all the whiners, look at this.

Star Trek Online, at number two! We stood by the game, and we're very pleased with this result. It is a deeply flawed game, we admit, but at the same time it's also one of the most unique MMOs on the market. It's got solid starship combat, impressive graphics, some compelling story elements and PvP, and, well... it's Trek!

Beam us up! ☺

## WHAT YOU SAID

### World of Warcraft

"Always evolving, always interesting - need I say more?"

### Star Trek Online

"If you're a Trekkie, you have this game."

### Lord of the Rings Online

"Highly addictive gameplay, and I love jumping online with my Fellowship."

### Aion

"Best looking MMO out, combined with very fun gameplay."

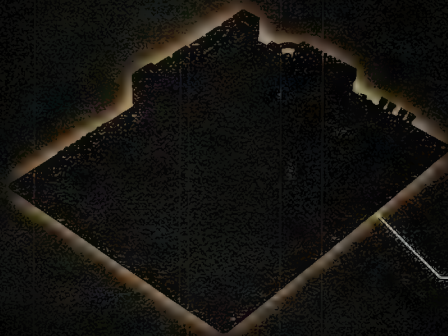
### EVE Online

"An entire universe to explore, huge space battles, and several different classes to suit players."



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# atomic

## GAME OF THE YEAR AWARDS

### ACTION/RPG

From high fantasy to hard science fiction, and all points in between, this was one of our closest fought categories.

In a lot of ways, it's getting harder and harder to pigeon-hole modern games. Once upon a time, and RPG or an FPS was a rigidly defined genre, but with the advent of games like *Mass Effect* or *Fallout 3*, that line's blurred considerably. And even then, when you look at action games like *GTA* or *Mafia*, they are defined as much by their roleplaying aspect as they are the action and car-chases.

Nonetheless, as close as this category was, we not only ended up with a clear winner, but also a very clear idea of who's making the best RPGs, and which game most typifies this spirit of crossover.

#### 5. Mafia II

*Mafia II* was very likely a game plagued by its own expectation. Many fans of the first game were hoping for a similar epic, but instead a much more challenging experience to assimilate. It was much shorter, for example, and while it had the trappings of a *GTA*-style game, it was



most certainly not that.

But what it was was an excellent meditation in game-form on the classic gangster tale. With car-chases and sharp-suits. We rated it very highly, but that expectation thing worked against it for many fans. Regardless, it's made the cut and deservedly so.

#### 4. Assassins' Creed 2

In a lot of ways, *Assassins' Creed 2* is the polar opposite of *Mafia II*. This is a game that's purely about action and sharp, deadly toys, and how to employ them to best stabby effect. To the extent that there is a story at all, it's at the service of instigating more and more levels of stabby violence.

And what delightful violence it all is!

To be honest, it wasn't a game that impressed us, but we suspect that's more a platform issue than anything else. For all of Ubisoft's intent to release simultaneously on all platforms, it never does. Certainly, it impressed you enough to make fourth on our Action/RPG list, and that's the whole point (and a sharp point it is too – ow).

#### 3. Dragon Age: Origins

Oddly, as time has worn on we've become increasingly of the opinion that we scored *Dragon Age* way too high in our initial review. In hindsight, it's not the great game we thought it was, but it appears that we're somewhat alone in that estimation. It's hit three on our list, and appears to be the top game of 2010 for many of our readers.

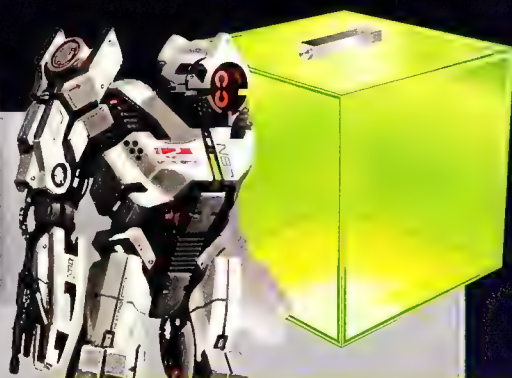
Maybe it's the snarky elf sex?

It's also just one of two Bioware games to make the cut, which places them firm fixtures as one of Atomic's favourite developers.

#### 2. Fallout: New Vegas

Here it is for the second time – quite a feat!

We thought long and hard about letting it



#### WINNER: Mass Effect 2



Good job, Atomic – we couldn't agree with you more on this one.

*Mass Effect 2* was a stunning achievement in storytelling and game construction. From the character-lead quest system, to the streamlined combat, and the bold move to more or less strip out any hint of a traditional inventory system.

It all lead to one of the most satisfyingly complete, and emotionally powerful, gaming experiences of the year. With Bioware hinting at its next big game as we speak, and work still continuing on its first MMO, we're confident that the company will continue to appear at the top lists like this for years to come.

into only one category, or combining votes from both, but in the end we decided it was a more fitting testament to one of our favourite games of the year – despite the bugs! – to let it count as both a shooter and a roleplaying game.

This is a truly impressive achievement. It is very likely one of the most bug-ridden games of the year, but it's one that's compelling people to playthrough after playthrough regardless. It's open, entertaining, and packed with memorable characters.

As the bugs get stomped patch-by-patch, it's only getting better and better. And we've not even started with the mods yet...



## WHAT YOU SAID

#### Assassins' Creed 2

"After playing the first *Assassins' Creed* I knew I wanted more."

#### Mafia II

"Everyone wants to be Don Corleone, this is close enough..."

#### Dragon Age: Origins

"Found the stories for each race/class made me connect with my character."

#### Fallout: New Vegas

"What a world! The freedom is amazing."

#### Mass Effect 2

"Awesome cut-scenes, awesome story, great in-game graphics, intuitive UI, PROPER SCI-FI!"





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## atomic

GAME OF THE YEAR AWARDS

# RACING

It's not the most packed of grids, but that first corner is a doozy...

**W**e're not really huge fans of racing games here at Atomic – we tend to outsource any racing coverage to better minds than ours. When it comes to high-speed cornering we're more likely to have a high-speed crash. Honestly, we're just more comfortable with a Franchi SPAS than a steering wheel.

That said, there's a passionate community of Atomican racers out there – all you need to do is look in our PC Gaming forums for the awesome F1 2010 championship one of our most passionate Atomicans is running to see the evidence. And speaking of F1...

### 5. Forza 3

There's an interesting mix of racing games in our top five, ranging from detailed sims to fun arcade dashes. Forza falls firmly in the sim category, with many of our readers praising it as the largest, most detailed racing game on the market.

And who are we to argue?

### 4. Blur

Not so much a sim or an arcade racer, Blur is more of a combat experience, delivering truly explosive action, cars with guns, and thrilling LAN and online play. Is there a more heady mix?

The hoary old Car Wars player in us says "Hell no!"

### 3. Need for Speed: Shift/World

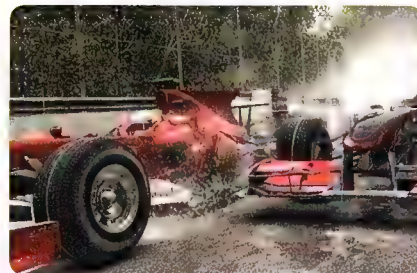
Sure, this is really two games, but it's proof of the enduring attraction of the Need for Speed franchise. The mix of high-octane arcade-style racing, the sexiest, shiniest cars on the market, smooth tunes and a criminal undertone make the series an enduring classic.

And having actually played a bit of the latest, it's only getting better with age.

### 2. Colin McRae: Dirt 2

For some racing fans, it's all about getting off-road, and few rally games deliver that scene as well as Colin McRae's Dirt 2. It looks great,

### WINNER: F1 2010



How's this for a turn-up? This is another one of the games that has achieved greatness despite being almost too buggy to play – but when you get down to some online multiplayer, in championship mode, F1 2010 offers a racing experience that is as about as immersive as you can get without investing billions in a racing team of your own.

How immersive? Check out the thread on our forums for an ongoing championship, complete with team drama, news updates, a full ladder, and more competition than the real thing!

features some of the best physics in racing (whatever a Scandinavian Flick is, it sure seems popular! Just sounds like something from a porn film to us), and unparalleled atmosphere.



## atomic

GAME OF THE YEAR AWARDS

# CLASSIC GAME

**A**ll of us have a classic game we love to play – it might not look good any more, but it's something that, either through nostalgia or brilliant gameplay, still thrills us. We still get a huge kick out of firing up Day of Defeat Source and pwn'ing some Germans, but we're curious to know what classic games get Atomic all fired up...

### 5. Super Mario Kart

Yes – what an awesome game! We've lost entire days to the wheeling and dealing of Super Mario Kart. It's bright, child-like and colourful fun that's as addictive as it is challenging.

### 4. Serious Sam HD 1/2

We can still remember our first experience of this over the top shooter. It was like someone had distilled the essence of old school shooters like Doom, ground it into a fine powder, then racked up a couple of lines for you to snort.

Pure FPS fun.

### 3. Sonic the Hedgehog

True story – I used to have a friend who, for a living, dressed up as Sonic for shows at local malls and shopping centers. Odd, yes, but that's a sign right there of just how huge this game was. I mean, you don't see people dressing up as Kyle Kataarn at Westfields!

Which is a shame, really, 'cause that would be totally awesome.

### WINNER:

### Secret of Monkey Island

Lucasarts might seem like an odd name to invoke when it comes to great gaming, but there was a time when it was the go-to development house for great adventure games, and there are few greater, or more impactful in terms of story design and use of humour in a game, than The Secret of Monkey Island.

### 2. Goldeneye 007

It's quite appropriate that as we're about to see this game rebooted for the latest Bond incarnation that it come close to top of Atomic's classic games. Whether you played it on the N64, or one of the many PC conversions, this was a classic – the true proof of concept that the FPS could work on a console.

And YEARS before Halo. Very clever, Mr Bond...



The recent re-release has doubtless brought many new gamers to the story of Guybrush Threepwood, but we're sure there are many here who still play the original.

It's that good, and a deserving *All Time Atomic Classic*.



# CONCLUSIONS

Gaming's been the winner today...

So there you have it – we asked, you voted, and we got a pretty clear result.

It's odd, really. Like we said, there were quite a few who mentioned when we started this poll that it's been a poor year in gaming, but going back over these pages makes me think those folks are quite wrong.

Sure, there might be some slow areas. For instance, the top new MMO of the year is a game that's widely held to be a failure. Sure, Star Trek fans – and we're among them – might feel a lingering love for Star Trek Online, but the numbers that bulked out the game at launch are now drastically thinned. And that's the best new MMO of the year? Perhaps it's the power of World of Warcraft – everyone keeps referring to MMO launches as possible WoW killers, but we suspect that kind of attitude is actively damaging the genre. The truth is, Warcraft, and to a lesser extent Lord of the Rings Online, are popular because of the ongoing efforts to streamline and evolve the game. Judging an MMO the year of launch can be a fraught business – perhaps Star Trek will surprise us yet.

Let's see if it's on the list next year.

However, despite some slow areas, other genres are bursting with goodness. Look at Mass Effect 2, Fallout: New Vegas and even Dragon Age. We might be thinking the latter is looking a bit worse for wear now we have some distance on it, but we seem to be the exception: If you're an RPG fan, it's been a huge year, and there's a good chance those games – thanks to solid DLC, excellent replayability and dedicated mod communities – will continue be played for years to come.

Strategy too is strong, whether you look the mine-build-rush model or the more historical strategic view. And to be honest, you can almost take Starcraft 2 out of the running to get a more accurate idea of the top

games – it would win if it were three lines of badly written code on the back of a damp beer coaster.

Thankfully, though, for all the issues with the game, it is brilliant, and we can't argue with it taking top spot.


However, our heart of hearts will always belong to the shooter, and thankfully we're not alone. More people voted for first or third person shooters than any other genre. Strategy was the follow up, then RPGs, MMOs, and finally racing games. Which, interestingly, tells us our current weighting of review space is pretty much bang on.

Be that as it may, it has been a challenging years for the shooter fan, especially if their platform of choice is the PC. For some reason, developers seem to be taking network and online play backwards in terms of functionality. LAN play is almost unheard of in this year's crop of shooters, for instance, and all too often we're treated to stripped back engine so that the game can run on a console.

But we're persevering. The shooter is still the go-to game for most Atomicans, but we have to wonder... for how much longer? For a long while, pundits thought that proliferation of cookie-cut World War 2 shooters was heralding the end of the show, but it wasn't – and the same could be said of today's glut of modern cookie-cutter shooters. Even one of the great white hopes of the genre, Homefront, is effectively more of

the same, albeit with a clever twist.

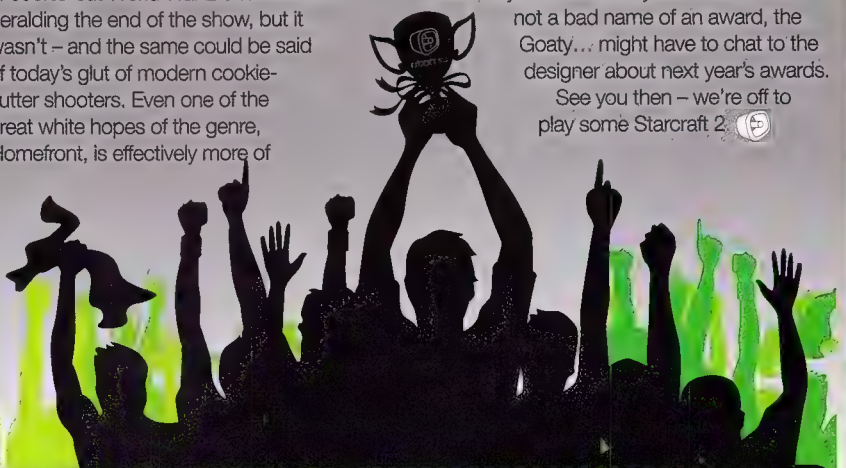
Not to mention LAN-play promised by the devs. Maybe it'll be next year's GotY. Huh – not a bad name of an award, the Goaty... might have to chat to the designer about next year's awards.

See you then – we're off to play some Starcraft 2. 



## TOP 3 GAMES OF 2010

1. Starcraft 2: Wings of Liberty
2. Battlefield: Bad Company 2
3. Mass Effect 2



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## SPONSORS

Making the time to collate, host and write an awards of this scale can be pretty tough, but thankfully we had some generous sponsors who allowed us a bit of breathing room to make it all happen. They also delivered some tasty prizes to entice you all to vote, so they deserve our double extra awesome thanks.

So, if you're not on train or reading this on the toilet, put your hands together for them. GIGABYTE, ASUS, and Kingston gave us some juicy tech, while AIE kept us supplied with backrubs and an impressive cheer squad for those last few awkward words.

Thanks guys, we could not have done it without you!





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# HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

**W**ell, you asked for it, so we're delivering. Gaming headsets. Half a dozen of them. From the sublime to the super-head-squeezy, this month's head2head takes a look at some options for your sonic near-future. Get your ears ready for some hardcore loving ...

Also in the labs this month, Justin teams up with *PC & Tech Authority's* uber-reviewer, John

Gillooly, for a long hard look at NVIDIA's latest Fermi release – the long-awaited GTX 580 – and the lads like what they see. So much, in fact, that they wrote a book on it (well, nearly ...)

And, as usual, there's lots lots more, including a most truly awesome new way of looking at the humble PC case. So move along. There really is nothing more to see here ...

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atomic





# HOW WE TEST

**W**e do a lot of testing in our labs, and we look long and hard at every piece of hardware to determine whether or not it passes muster. From taking a new card out of its packaging, to bundled extras, to performance, every facet of a given piece of kit's 'user experience' is under scrutiny.

In some instances, we have tough benchmarks to help us rate gear. For a CPU or a graphics card, raw performance is, of course, the most vital stat as whether it stinks or smells like roses, as well as the ability to overclock well. But there are other things we pay attention to in the review process.

Value for money is an important consideration, especially in the current financial climate. High end gear is expensive enough as it is, so we look for good bundles. For instance, a graphics card that comes with a game or two, all the cabling you'll need, and little surprises like tools and other bumpf will score higher than a card that costs similar, but doesn't give you any presents.

Build quality is another thing we rate. From a PC case to a motherboard, we like our hardware well-made and capable of taking a bit of punishment. We also like any included manuals to be clear and concise.

A lot of what we look for can be hard to put into numbers, we admit, but we try to think about what any enthusiast would think about their new gear after laying down money for it, installing it, and then using it.

And our benchmarks help, too. We've picked a suite of games and applications that anyone can get access too, so that you – the reader – can easily compare your own gear with the kit we have in each issue. In fact, we'd recommend to all our readers that they run all of these tests on their systems and save the results, so you can always have a familiar benchmark of your own to compare to the latest gear in Atomic.



Our test LAN: NRG systems with Phenom 9850 CPU, 4GB of DDR2 RAM and a 4870X2 graphics card. The mainstay of our games testing and events.





## CPU Benchmarks:

### Hexus PiFast

<http://pifast.hexus.net/pifast.php>

PiFast is a program that essentially calculates pi to a set amount of decimal places. It is a single-threaded application (one core/thread) and we run it at ten million places (10,000,000) using the Chudnovsky method, in the standard mode with no compression, and a FFT length of 1024kb. The program is free, so grab it and run it on your CPU. Memory bandwidth plays a significant role in the final performance of this program, so be sure you bump up the frequency as well as the CPU clock!

### wPrime

<http://www.wprime.net/>

"wPrime uses a recursive call of Newton's method for estimating functions", says the website as it attempts to explain in plain English what it does. What it does do is, essentially, complex square rooting and other number functions, which are able to be split up evenly between multiple cores, or simply run on a single core. We use wPrime 32M in both single and multi-threaded runs. The results of the single run are divided by the results of the multi run, and this gives us the efficiency of the CPU being tested – very useful knowledge to have when comparing chips and evaluating the benefits of overclocking.

### Cinebench R10 x64

[http://www.maxon.net/pages/download/cinebench\\_e.html](http://www.maxon.net/pages/download/cinebench_e.html)

Cinebench is a stalwart benchmark, and is one of the more entertaining ones to watch. It focuses on rendering an image at 800 x 600 resolution, complete with ray-traced light effects and much more. It can be run in either singlethreaded or multithreaded mode, and efficiency is calculated the same way as for wPrime. The program also supports up to 16 threads in total, and even eight threads with Nehalem is an impressive sight to see. The difference in performance between 32- and 64-bit is minimal – just keep that in mind if your results for the same setup are slightly different.

### Everest Ultimate Edition

<http://www.lavalys.com/>

Everest is a system information tool that monitors voltage, temperature, as well as reporting on a massive list of other areas of your system. Hardware and software are noted here, but perhaps the most useful part of this program is the memory benchmarks. Ready for the fastest of dual/tri-channel memory, this tests the read and write bandwidth as well as latency. The program is a small download, but keep in mind that you only get a thirty day trial until you purchase the full version – something recommended if you're into getting the most info about what your tech is up to.

## GPU Benchmarks:

### Crysis

<http://www.ea.com/crysis/>

Crysis is one of those games that can scale from Average Joe's rig all the way to the beastly Dream PC in Kitlog; but due to recent graphics card releases we needed to bump it up a notch. Our testing now uses a standardised timedemo run, with all settings on high at a resolution of 2560 x 1600. While we can't run any antialiasing at this res and still get playable framerates on most cards, it's still more than enough to really give cards the workout they truly deserve.

### Lost Planet 2

<http://www.lostplanet2game.com/>

Lost Planet 2 from CAPCOM may not have been a big seller, but its technology is a great implementation of DirectX 11 in version 2.0 of Capcom's existing MT-Framework game engine. It forms part of the atomic benchmarking suite due to its use of tessellation and other features in an actual game setting. Our tests use the freely available benchmark version of Lost Planet 2 and are run fullscreen at 1920 x 1200 with 8x antialiasing and 8x anisotropic filtering. Tessellation is set to Maximum and all the other settings cranked right up. Results are given in frames per second

### Unigine Heaven 2.1

<http://unigine.com/products/heaven/>

A synthetic benchmark built specifically to harness the latest and most demanding features of DirectX 11, Heaven is one of the best ways to test a card's tessellation capabilities. With a built-in timed run around a fully realised world, this benchmark taxes cards significantly and puts them under serious stresses. We test at a resolution of 1920 x 1200 using 8x MSAA and 8x AF, completing two runs of the built-in benchmark. The first run is with tessellation set to 'extreme'; the other 'none'. This highlights how well the cards can handle DirectX11 features and what they'll be like in a game that doesn't use the effect.

### 3DMark Vantage (2008)

<http://www.futuremark.com/3dmarkvantage/>

As the first extremely convenient benchmark program around for DirectX 10, 3DMark Vantage is a new contender in the benching scene – and is proving very popular. While you can download and run it for free, this is only once, requiring a small fee to register your copy (though the bragging rights for showing off your rig may be worth it). Some graphics cards will even give you a copy! We run this at stock settings, which is the most appropriate for comparison between our results and yours. This is also significantly better at multi-gpu performance scaling efficiency.



# NVIDIA GTX580

Justin Robinson and John Gillooly see if NVIDIA can redeem Fermi with a new reference heatsink and VRM chips.

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**Specifications** 772MHz core; 1002MHz memory (4008MHz effective); 'Fermi' GF110 core; 512 CUDA Cores; 1.5GB GDDR5; 384-bit memory interface; dual slot PCB with active cooling; dual 6-pin power connector

**Card info** [www.techpowerup.com/gpu/arueu](http://www.techpowerup.com/gpu/arueu)

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NVIDIA came really close to screwing up Fermi at the last minute. In an effort to remain relevant in the battle for DX11 hardware it rushed out the GeForce GTX 480, delivering a product that felt slightly undercooked. The 480 had less CUDA cores than NVIDIA had initially announced, and ran noticeably hot and loud – all signs that the GPU had been rushed out a few revisions short of perfection.

This was seemingly confirmed by the fact that the latter variants of the Fermi architecture ran incredibly well, with no sign of the heatwave that emanated from the GF100-based GTX 480 and 470 cards. These latter cards used new cores, ones that were less ambitious than the GF100 and its three billion transistors.

When we first saw the rumours leak out about the GeForce GTX 580, our assumption was that NVIDIA had kept back the best GF100 chips

and were launching a tweaked up version of the GTX 480 to compete with AMD's imminent 6900 series of GPUs. In reality, the GTX 580 uses a new variant of the GF100 silicon, codenamed GF110, and while the architecture is still Fermi, the GPU has had a lot of attention paid to the major weaknesses in the GTX 480. Both heat

and power draw have allegedly been solved with the GF110 silicon, and new additions to the reference design of the cards further act to improve cooling and TDP.

Besides these improvements, NVIDIA has also managed to get all the CUDA cores running on the GTX 580. When we reviewed the GTX 480 we noted that the initial briefings called for 512 CUDA cores, but the actual card had one block of 32 cores disabled. In what is a rarity this meant that the GeForce GTX 480 actually referenced the presence of 480 CUDA cores inside the GPU. Given that graphics card model numbering seems more about the illusion of ZOMG massive numbers than anything approaching reality, it is no surprise that NVIDIA has gone for a number 100 more than 480 rather than reference the 512 cores.

These minor architectural tweaks mean that we don't expect huge performance leaps with the GTX 580. This is a card with a dual purpose – keep competitive with AMD's top end, while erasing the major criticisms of the GTX 480. We have had industry sources confirm that there is also a GTX 570 in the pipeline, so expect NVIDIA to try and replace the GF100 lineup as quickly as possible.

One other significant side effect of the focus on improved power consumption and cooling is that NVIDIA has put in hardware and software optimisations for programs like Furmark, which are purely designed to load up a GPU to maximum. These optimisations throttle performance in order to stop the card overheating. When a program like Furmark or OCCT is detected, hardware VRMs kick in and reduce the card's performance. Some websites have managed to bypass these optimisations and it seems that the card will spiral out to 350W if the hardware isn't keeping it in check.

There is huge potential for debate over this move. Unlike optimisations made to improve benchmark scores, these ones seem deeply tied to the new power management paradigm.

## NVIDIA Graphics Processors

| Graphics Card                    | 8800GTX          | 9800GTX       | GTX280        | GTX480         | GTX580           |
|----------------------------------|------------------|---------------|---------------|----------------|------------------|
| Processing core                  | G80              | G92           | GT200         | GF100          | GF110            |
| Theoretical performance (GFLOPS) | 518              | 648           | 933           | 1345           | 1581.1           |
| Launch Date                      | November 8, 2006 | April 1, 2008 | June 17, 2008 | March 26, 2010 | November 9, 2010 |
| Manufacture Process (nm)         | 90               | 65            | 65            | 40             | 40               |
| Transistors (Billion)            | 0.681            | 0.754         | 1.4           | 3              | 3                |
| Physical Die (mm <sup>2</sup> )  | 484              | 324           | 576           | 529            | 520              |
| CUDA Cores                       | 128              | 128           | 240           | 480            | 512              |
| Tessellation Units               | 0                | 0             | 0             | 15             | 16               |
| Texture Mapping                  | 64               | 64            | 80            | 60             | 64               |
| Render Output                    | 24               | 16            | 32            | 48             | 48               |
| Reference Clock (MHz)            | 575              | 675           | 602           | 700            | 772              |
| Memory Size (MB)                 | 768              | 512           | 1024          | 1536           | 1536             |
| Memory Bus Width                 | 384              | 256           | 512           | 384            | 384              |
| Thermal Idle (W)                 | Unknown          | Unknown       | Unknown       | Unknown        | Unknown          |
| Thermal Load (W)                 | 155              | 140           | 236           | 250            | 244              |
| Card Length                      | 27cm/10.6"       | 27cm/10.6"    | 27cm/10.6"    | 27cm/10.6"     | 27cm/10.6"       |





In the end it's only working on software with very little real world relevance – Furmark et al. are designed as worst case scenarios, and have never had any pretence of representing real world graphics workloads.

In many ways, what NVIDIA is doing is similar to the way in which Intel uses TDP as an overarching boundary on processor speed. Exceed TDP and the CPU will throttle back. The major difference is that with the GTX 580 this is done on a case-by-case basis (at the moment it only happens with stress testing programs)

This throttling does have some impact on overclocking, as Furmark is used extensively to test stability of overlocks. In an effort to avoid issues due to throttling, we located a program called Computemark, which loads up the card with Directcompute commands in order to stress test it. We have included these results alongside the

Furmark bench ones. As you can see from the results, the GTX 580 is 78 per cent slower than the GTX 480 in Furmark, but in every other test it beats out the competition – in Computemark the 580 shows a 38 per cent performance boost over the GTX 480.

While the trickery with voltage is fascinating, the actual ingame performance of the GTX 580 is what has us really excited. For despite the fact that on paper the 580 looks like a minor improvement on the 480, the reality is that the GTX 580 shows remarkable performance gains over its sibling.

This new approach to TDP regulation is only part of the thermally-focused improvements in the GTX 580. New VRM chips go hand in hand with an improved cooler design. NVIDIA has abandoned the cooler used on the GTX 480 and is instead using a vapour-chamber based design. This is similar to the cooler design that has been employed by Sapphire on its ATI cards, although NVIDIA has come up with

Results comparison table (relative to GTX580)

|                             | NVIDIA GTX580                     | NVIDIA GTX480                            | GTX580(700MHz)                           | ATI HD5870                             | NVIDIA GTX460 SLI                        |
|-----------------------------|-----------------------------------|--|--|--|--|
| Crysis Average FPS          | 54.11                             | 45.19 (-20%)                             | 49.38 (-10%)                             | 43.92 (-23%)                           | 62.48 (+16%)                             |
| Crysis Minimum              | 40.6                              | 33.3 (-22%)                              | 32.51 (-25%)                             | 36.07 (-13%)                           | 35.97 (-13%)                             |
| Crysis Maximum              | 65.65                             | 54.44 (-21%)                             | 59.65 (-10%)                             | 49.73 (-32%)                           | 73.7 (+12%)                              |
| Lost Planet 2               | 47.3                              | 40.1 (-18%)                              | NA                                       | 27.3 (-73%)                            | 50 (+6%)                                 |
| Unigine Heaven              | 30.8                              | 26.4 (-17%)                              | 28 (-10%)                                | 15.9 (-94%)                            | 36.6 (+19%)                              |
| Unigine Heaven None         | 51.1                              | 42.4 (-21%)                              | NA                                       | 35.5 (-44%)                            | 63.7 (+25%)                              |
| Furmark Bench               | 1355                              | 2314 (+71%)                              | NA                                       | 1966 (+45%)                            | 1706 (+26%)                              |
| ComputeMark                 | 1677                              | 1219 (-38%)                              | 1526 (-10%)                              | 1444 (-16%)                            | 1046 (-60%)                              |
| 3DMark Vantage: Performance | P28317<br>[C: 57876,<br>G: 24197] | P22576<br>[C: 53869,<br>G: 18913] (-25%) | P26096<br>[C: 55788,<br>G: 22165] (-9%)  | P18451<br>[C: 19944,<br>G: 18002] (NA) | P29231<br>[C: 47050,<br>G: 25955] (+3%)  |
| 3DMark Vantage: Extreme     | X12997<br>[C: 20012,<br>G: 12762] | X9935<br>[C: 19972,<br>G: 9679] (-31%)   | X11734<br>[C: 19892,<br>G: 11486] (-11%) | X9306<br>[C: 19818,<br>G: 9053] (-40%) | X14928<br>[C: 20021,<br>G: 14731] (+15%) |

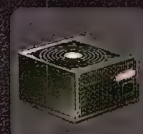
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## ASUS VG236H 120Hz Monitor

Street Price \$640 Supplier ASUS

Website <http://www.asus.com.au/>

Specifications 23in widescreen; 1920x1080; 400cd/m2

Sometimes it seems monitor manufacturers are so obsessed with high volume, low cost business that the really cool tech gets neglected. Trying to find one of the handful of 120Hz LCD screens on the market is often a frustrating experience, and the ASUS VG236H is the first such monitor to get seriously pushed in the Australian market, appearing in such non-esoteric stores as Harvey Norman.

Unfortunately it seems one of the drivers of this is NVIDIA, which means that ASUS is selling the VG236H as part of a bundle with NVIDIA 3D Vision kits. Now 3D is a wonderful novelty, especially in a game like CODBLOPS, which has been designed with 3D in mind. In reality though, this bundle is in danger of pricing itself out of the market thanks to the obligatory 3D glasses tax added to the price.

It is important to separate out the two advantages of a 120Hz screen. The first is that it is capable of displaying enough images to sustain LCD shutter-glass-based 3D. The second, infinitely more important thing about 120Hz screens is that they can sustain framerates higher than 60fps without tearing. We'd argue that while 3D is an occasional novelty, the real, consistent benefits of a 120Hz screen come down to this tear-free high

framerate gaming.

We ran ASUS' VG236H through its paces in various games. There was the obligatory CODBLOPS 3D stint (of all the games released this is probably the best ambassador for 3D) as well as some extended sessions in games like Civ 5 and Need For Speed: Hot Pursuit. Our tests were done with the GeForce GTX 580 so the framerates were consistently over 60fps, and it was incredibly noticeable.

CODBLOPS is a great game to show off the advantages of 120Hz. Because of its console roots, the engine barely stresses a high end PC. Using a GeForce GTX 580 and Phenom II X6 1090T the game happily sat on 91fps for the most part, even with all the details cranked up. On a standard 60Hz screen with Vsync disabled this would be ugly due to the amount of tearing going on. But on the ASUS screen this framerate was delivered in a smooth as silk manner.

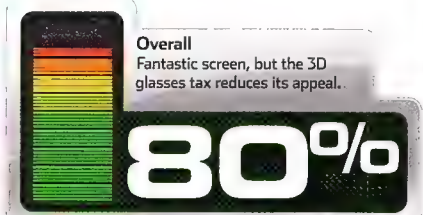
This great performance is backed up by remarkably good image quality for a TN panel. The screen is incredibly bright, which is of great benefit when using 3D glasses, colour reproduction is strong and images are free from ghosting.

We also dig the adjustable stand, as well as the ability to mount the screen in landscape or portrait (both are all too rare nowadays). DisplayPort would have been a nice addition rather than just HDMI and DVI, but the only major



annoyance with the screen is the horrible glossy coating layered onto it. This makes some lighting conditions quite annoying.

We really dig the VG236H, but wish we could get it without having to fork out the extra cash for NVIDIA's 3D Vision kit. When it comes to screens a gamer's priority should be for 120Hz, with something like 3D a novelty that may be added later. This screen could be spectacular, but in the end it is too expensive to passionately recommend.



its own design rather than licensing one from a competitor. All the initial GTX 580 cards use this reference heatsink, although most manufacturers are already underway building new customized heatsinks for the card.

By using a vapour chamber rather than heatpipes, NVIDIA is able to kill two birds with one stone. The fan has to work less, so the card is quieter, while the more efficient heatsink design helps the GTX 580 to run cooler. Our noise testing was done with the GTX 580 and 480 fans running at 85 per cent (the maximum speed we could set the GTX 580's fan to) and both managed to register the same 81.9dBA result at that speed. The GTX 580 is noticeably quieter though, because its more efficient cooling means that the fan doesn't have to work as hard.

As for temperatures, at idle the GTX 580 was sitting on 40 degrees, which jumped to 81 degrees under load. This was a tad less than the GTX 480, which registered 43 degrees at idle and 88 at load. While the idle temp of the GTX 580 came in under that of the RADEON HD 5870, AMD's offering only hit 66 degrees under load, noticeably less than both of NVIDIA's offerings. So while the GTX 580 is certainly a major improvement over the GTX 480, it is still a

pretty toasty GPU when running at full tilt.

We ran the GTX 580 through a battery of testing, at both the standard clock speed and underclocked to the same speed as the GTX 480. The underclocked tests have little real-world relevance, instead they give us a theoretical idea of how the GF100 and GF110 GPUs compare. We have compared the results to ATI's RADEON HD 5870 (a last minute shift in release date meant we weren't able to include AMD's new

high end GPUs in our testing, you'll need to wait until next month for those tests) and the GeForce GTX 480 as well as 1GB GeForce GTX 460 cards in SLI.

We've reported our results with percentage performance relative to the GTX 580. A negative percentage means that it is slower than the GTX 580, while a positive percentage means it was faster than the GTX 580.

Apart from the aforementioned Furmark



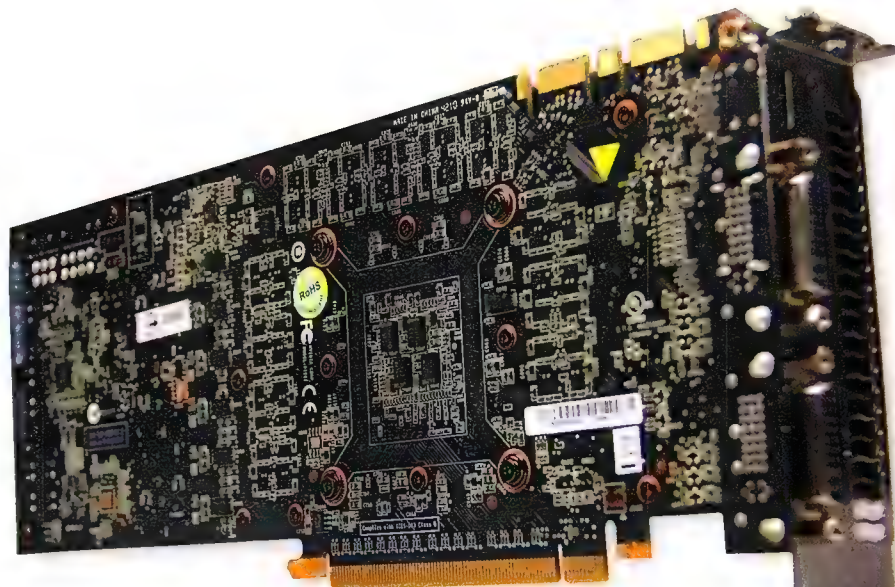


testing, the GTX 580 comfortably beat out the GTX 480 and RADEON HD 5870 in every test. In Crysis the GTX 580 sustained an average of 54.11 fps in high detail tests, a 20 per cent improvement over both the GTX 480 and the RADEON HD 5870, but actually beaten out by the SLI GTX 460 cards, which delivered 62.48 fps in the same test.

We were disappointed by the overclocking performance of the GTX 580, however. We managed to get it running at a moderate 840MHz core, 1030MHz memory overclock, and it only managed to deliver a 6 per cent performance improvement in Crysis. This confirms our suspicions that NVIDIA has clocked this card to within an inch of its life in order to claim the DX11 performance crown from AMD.

The rest of our testing focused heavily upon specific DX11 performance. There are arguments currently being raised by AMD about just how much tessellation is enough, with claims that tessellation benchmarks are much more extreme than real world implementations of the technology. AMD's architecture has much less in the way of tessellation hardware than NVIDIA's, which drives their argument.

We've become quite used to Radeon cards suffering in Unigine's heaven benchmark, which is a worst case tessellation scenario. Because of this we recently introduced Capcom's Lost Planet 2 benchmark, which features real implementations of tessellation. From looking at the results the gap between NVIDIA and AMD's architecture may not be as big as it is in Unigine, but it is still significant, with the RADEON HD 5870 73 per cent slower than the GTX 580. This



gap opens out to 94 per cent when we look at the extreme detail Unigine results, although the GTX 580 is still 44 per cent faster than the RADEON HD 5870 when tessellation is turned off in Unigine.

With 3DMarkII still on the cusp of release, we have tested with the tried and true 3Dmark Vantage. We've run both performance and extreme settings, for extreme we turned off PhysX to get an unbiased idea of numbers, while the performance results have PhysX enabled and are hence quite NVIDIA biased.

While this means we cannot compare performance numbers between AMD and NVIDIA, we can still compare the results of the extreme tests. In these tests the GTX 580 stood head and shoulders above the other single card solutions, 40 per cent faster than the RADEON HD 5870 and 31 per cent faster than the GTX 480. With Vantage reaching the end of its lifespan we wouldn't put too much credence in this performance gap, but it will be fascinating to see how the results change once we move beyond the idiocy of including PhysX in a benchmark and get to 3DMarkII's Directcompute heavy approach to rendering.

Overall, the GTX 580 comes out of our testing looking pretty sweet. It is 17.8 per cent faster than the GTX 480, and a whopping 83.4 per cent faster than the RADEON HD 5870, although this is heavily influenced by the tessellation results.

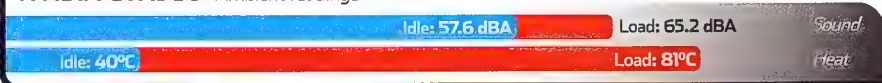
What is most astonishing is that the real victor in our tests is the humble GeForce GTX 460. Two of these cards in SLI consistently beat out the GTX 580, which was 13 per cent slower than the SLI setup. Considering that you can buy the two GTX 460 cards for under \$450 while a single GTX 580 sets you back around \$600, this becomes an powerfully tempting alternative.

The GTX 580 is an incredibly powerful card, and has snatched the single GPU performance crown from the hands of AMD. Unfortunately while the heat and noise problems that plagued the GTX 480 have been fixed, the third problem of pricing has reared its ugly head again. The SLI GTX 460 option is so tempting because it uses the same architecture as the GTX 580 without the associated heat and cost. No matter how awesome the GTX 580 is, it's still a costly extravagance rather than the must buy that we secretly wished it would be. (E)

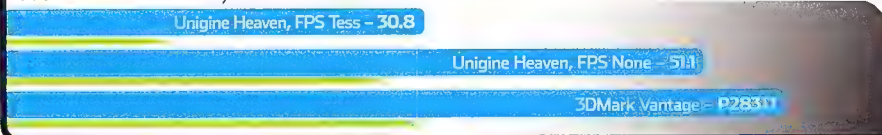
#### Extreme marks per dollar

| Card              | Street price \$ | X/\$   |
|-------------------|-----------------|--------|
| NVIDIA GTX580     | 650             | 19.995 |
| NVIDIA GTX480     | 550             | 18.064 |
| ATI HD5870        | 400             | 23.265 |
| NVIDIA GTX460 SLI | 520             | 28.708 |

#### NVIDIA GTX580 Ambient readings



#### NVIDIA GTX580 Synthetic Benchmarks

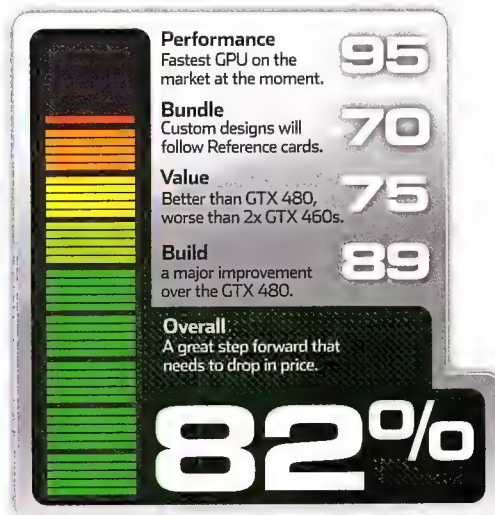


#### NVIDIA GTX580 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second







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# Sapphire Radeon 6850

Mid-range graphics just got midder.

**Street Price** \$240 **Supplier** Sapphire  
**Product page** <http://goo.gl/ip5ZA>  
**Specifications** 775MHz core; 1000MHz memory (4000MHz effective); 'Barts PRO' core; 960 shader units; 1GB GDDR5; 256-bit memory interface; dual slot PCB with active cooling; 6-pin power connector  
**Card info** [www.techpowerup.com/gpuze/767x](http://www.techpowerup.com/gpuze/767x)

9% OC



Last month saw the launch of the 6870, a card that messed up the naming scheme somewhat and confused the high-end nomenclature. No longer the fastest single-gpu card, the 6870 launched alongside another name-changer: the 6850. While it is an unintuitive comparison (similar to comparing an apple with an orangutan), the 6850 does not replace the current 5850 – instead, it's more like a 5830 v2.0.

Running at the heart of the 6850 is the same 'Barts' core that was used in the faster 6870 model, though in this case it's reduced in core speed from 900MHz to a more sedate 775MHz. The memory bus is thankfully left untouched and accesses the 1GB of GDDR5 memory chips through a 256-bit bus, which provides bucketloads of bandwidth; especially when taking the shader unit count into consideration. The 6850 lags behind the 6870 by 160 shader units; though transistor counts remain the same at 1.7 billion, demand for memory access is invariably less.

On the flipside is a benefit to losing out on shaders: the power consumption at load drops to 127 watts, saving a cool 24 watts when running at full tilt. It's not quite low enough to be handled within a single-slot cooler, but it's definitely manageable. AMD seem to be taking a hands-off approach here, and rather than enforcing a reference design like has been done

in the past, partners have the ability and freedom to create their cards whichever way they please. Cue a raft of crazy designs!

Sapphire has chosen to cool the card with a simple dual-slot heatsink that places a large fan slightly off-centre, but directly over where the processing core lies. This fan is exceptionally quiet at idle, barely registering on our sound-level meter at only 46.1dBA, and only generating 54.7dBA at load – most cards are this loud at idle! Cool air is sucked in by the fan and passed through an aluminium-finned heatsink contained entirely within the glossy plastic shell of the card, where the cool air becomes warm air and moves along the inside of the shell to be exhausted at both ends. Heat is drawn from a copper plate that contacts the processing core by heatpipes, which are quite literally pipes that heat can move through, which dump their heat into the aluminium fins. Unfortunately the design of Sapphire's cooler means that most heat will wind up inside the case and won't be vented outside, so as always, we recommend that you have a

high-airflow case to keep components stable.

It definitely seems more than capable of cooling the 6850's low-fat heat load, and an idle temperature of 36 degrees was so cool that heat could barely be noticed when touching the card itself. Though a load temperature of 64 degrees is noticeably warm, it's not excessively so, and is certainly lower than the 6970 et al.

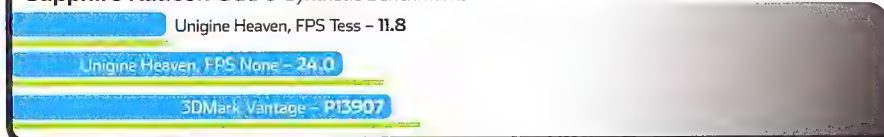
Performance of the 6850 is actually quite tempting compared to the 5850: returning ten per cent fewer frames in Crysis; 18 per cent slower in Lost Planet 2; identical performance in Unigine Heaven tessellated (though it was 13 per cent slower without tessellation); and P849 shy of the 5850 in 3DMark Vantage – a gap of six per cent.

At \$60 less than the 5850, the 6850 is 25 per cent cheaper with only a slight drop in performance. Compared to the 5830, the 6850 is a clear winner. While there is a lot that it's not – a high-end card, a powerhouse performer, a heavyweight champion, or a stellar overclocker – the 6850 is very tempting value for those after gaming below their price barrier. **JR**

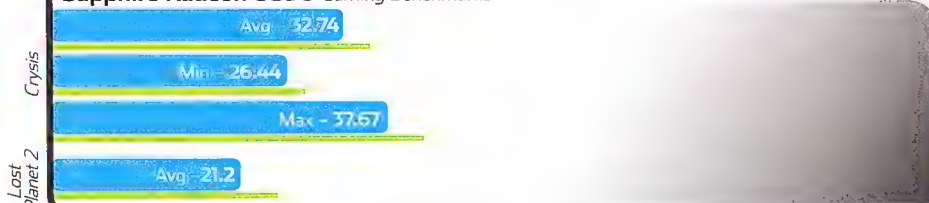
## Sapphire Radeon 6850 Ambient readings



## Sapphire Radeon 6850 Synthetic Benchmarks

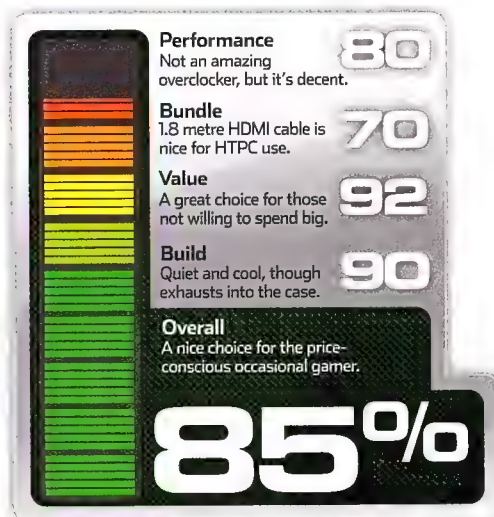


## Sapphire Radeon 6850 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second





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# Ozone EXPOSURE mouse mat

It's flat, it's black, and it's splashed in blood...

Street Price \$26 Supplier Ozone Gaming  
Website <http://www.ozonegaming.com>

We had a look at an Ozone mouse last issue and we found it to be a solid option for your pointing needs, if a touch uninspired. This month we're looking at one of Ozone's mouse pads, the loudly-named EXPOSURE.

It's always odd reviewing a mouse pad – you start out thinking you can't possibly have an opinion on something that's essentially a flat plastic mat, but then you get reminded of just how finicky the average gamer can be when it comes to their mousing surface.

The EXPOSURE is a two-piece pad, with a hard plastic upper surface dramatically splashed with red, in a bloody splatter, and with a nodule-laden rubber underside. We've a preference for hard mousing surfaces – as opposed to foam ones – so were curious to see if this could stack up to our current favourite, the CM Storm BattlePad.

And whoa... it really can't.

Combining it with our test Razer mouse, we found the scratchy upper surface really dragged at the worn feet of our Razer. In the

Kill House training level of CoD4, this produced an alarming and inconsistent amount of drag on the mouse, slowing down our complete-time by up to a second. We also found ourselves concentrating on smoothing out the movement so much that we missed doorways and screwed up grenade timings. If you bought the EXPOSURE and a new mouse, you won't have quite that issue, but if you're using an older, worn mouse – and chances are you won't be upgrading both at the same time – be warned.

Further to that, the rubber lower surface isn't quite grippy enough, so the mat moved around a bit beneath our hand. What's more, when we flipped the pad over to have a look at the underside, we noticed that it was about a millimetre smaller than the upper surface, and in the overlapping space you could feel the tacky glue holding the two layers together. In other words, it's a crap trap, and even during our testing it was picking up lint, hair, crud, crap and who knows what else from around



our NRG gaming rig. Not ideal.

Which sums up the entire EXPOSURE experience, really – there are simply many better options out there. **DH**



# OCZ Fatal1ty 750W PSU

The face that launched a thousand mousepads tries its hand at the power game.

Street Price \$160 Supplier OCZ  
Website [www.ocztechnology.com](http://www.ocztechnology.com)

Specifications Captive: 24-pin, 8-pin ATX, 2x4pin ATX | Modular: 4 x 6+2-pin PCI-E, 6 x Molex, 6 x SATA, 2 x Floppy, 80-Plus Bronze certified.

Over the past decade the decidedly 1337 Fatal1ty moniker has ended up on all sorts of products from headphones to mousemats. Now the pro-Quaker has lent his name to a PSU. Just what a PSU has to do with pro gaming escapes us in the Atomic labs – we are far more interested in the fact that the PSU comes from OCZ.

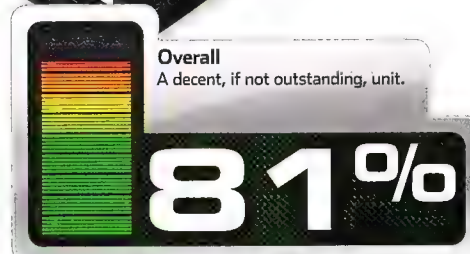
According to the OCZ website, Jonathon 'Fatal1ty' Wendell spent time working with OCZ to create the perfect gamer PSU. This hasn't exactly led to a revolution, with flattened cabling the most striking thing about this unit. And while flattened cabling is fantastic for threading through tight gaps behind motherboard trays, its major advantage is less interference with airflow inside your system.

This PSU ships with captive ATX and ATX 12V power connectors, but everything else is

modular. The PSU is SLI certified and comes with four PCI-E power connectors (although we don't advise trying to run quad SLI off a 750W PSU). It also has six Molex, two floppy and six SATA connectors, all using a low profile cable design.

Besides these the Fatal1ty 750W is about what we'd expect from an 80 plus Bronze PSU. At load it delivers 12.2V on the 12V rail while staying nice and quiet thanks to the large fan on the base of the PSU. It is perfectly competent, falling well within what we would expect from a supply of this rating.

At around \$160 this is a reasonably priced, decent performer. The flattened cables are a really nice touch for those who want to get serious about cable and airflow management, and the PSU itself lives up to its advertised specs. Add to that a five year warranty and this is a very tempting unit. **JG**





# GIGABYTE Aivia K8100

A stealthy addition to GIGABYTE's keyboard range has us intrigued...

Street Price TBC Supplier GIGABYTE  
Website [www.gigabyte.com.au](http://www.gigabyte.com.au)

The first thing we thought when we saw GIGABYTE's latest keyboard was "Whoa! Ugly! My eyes!" That's because we saw the horrific cholera-yellow model of the board that was sent to the folks at PC Authority, our sister magazine. Very fortunately, GIGABYTE sent us the infinitely lovelier matte black model to review – and it's a much easier colour (or lack thereof) on the eyes.

So if that was our first thought, and our second thought was "Thank heavens", our third was what a perfect keyboard this would be for owners of any of the Raven series of cases by Silverstone – the two products share a remarkable design similarity. The Raven's obviously drawn a lot of inspiration from the B17 stealth bomber, and we suspect the design team behind the Aivia was similarly war-nerdy.

Thankfully, however, the Aivia doesn't leak av-gas onto your desk.



**GIGABYTE's pulled out all the stops to create a real high-grade gaming keyboard – or, at very the least, one that looks the part.**

What it does do, however, is take up a lot of desk real estate. It's a full-size keyboard with a generous surrounding fascia and quite a deep wrist rest – which you can remove if you'd rather a smaller footprint. If you've got the room for it, however, you'll be quietly impressed the moment you plonk it down. Rubber feet make the board feel very secure and there are even rubber tips on the flip down feet beneath. The wrist rest may look a little odd, but is surprisingly comfy.

The Aivia has a real luxury feel to go with its luxury size, and this even extends to a cloth-braided USB cable, and a switch to light up the keys with a soft red glow. There's also a touch sensitive strip along the top of the board that lets you swipe your finger up and down to change volume on your system. Finally, you can set the angle that the USB cable emerges from the keyboard, thanks to a small cable run underneath.

In other words, GIGABYTE's pulled out all the stops to create a real high-grade gaming keyboard – or, at very the least, one that looks

the part.

In actual use, though, the Aivia is a little bit of a let down.

As a gaming keyboard, GIGABYTE's made loud noises about the board's variable key weight. Important keys, such as WASD – feature a heavier keypress weight of 70gms, while those keys you only want a light press of – such as the Shift, Z and X keys – come in at only 50gms. All the other keys are set at a mid-range 60gm. It's a good idea on paper, but in practice it merely made the WASD keys feel muddy and unresponsive. It's also a feature that only really appeals when you're actually gaming. Any kind of typing – and let's face it, most of us do a fair bit of that – becomes a little tricky, especially if you're a touch typist.

The keys also have a slightly longer travel than our standard Razer Lycosa, which further adds to the feel of laggy performance. Another dark spot is in the Aivia's built-in macro editor. It's certainly powerful, if a little involved, but what really annoys is the GUI of the app – it's

full of metallic sheens, and little machine-like animations. It's obvious that GIGABYTE have put a fair bit of effort into creating it, but really, if we're recording a macro we just want a useful interface; it's a utility, not a game! Plus, for all the power of a fully-specced macro editor, unless you're a serious raider in something like World of Warcraft, all that power's a bit of a waste. You'd do just as well with the in-keyboard macro functionality of Microsoft's X6 keyboard.

The Aivia's bit of a mixed bag, ultimately. If you're an MMO player, we'd suggest it as a good option, but fans of twitchy shooters might feel let down by the key design. We've yet to get a locally confirmed price, too, but at SUS59 we expect it to certainly be a good choice value-wise. Just know what you're getting – and maybe stay away from the bright yellow version. **DH**



**Overall**  
Great features,  
but poor key action.

**79%**



# Superflower SF-800

Would a PC case by any other name smell as sweet?

**Street Price** \$80 **Supplier** Superflower  
**Website** [www.super-flower.com](http://www.super-flower.com)

**Specifications** 500 x 205 x 460mm (D x H x W); 1x 140mm fan (front), 1x 120mm fan (sidepanel), 1x 140mm fan (top), 1x 120mm fan (rear); 8x 5.25in drive bays (external), 4x 2.5in bays (internal); 7x expansion slots; 8kg; mATX and ATX; SECC construction.

There's a lot to be said for cheap and cheerful gear, but one of the areas you probably want to avoid it is in a serious PC building endeavour. And, frankly, that's what Atomic's all about – building the best PCs we can, to deliver the best experience in day-to-day computing and gaming. So how then does this Chinese-made, oddly named enclosure stack up to our enthusiast-grade demands?

Well, first up... huh. From most angles there really isn't a lot to write home (or here) about in terms of the SF-800's looks. The front fascia is an unimaginative curve of black metallic mesh, with a finer anti-dust filter behind. The left side panel is unremarkable, whereas the back-panel hints at a rather colourful interior, as well as being studded by three rubber water-cooling grommets and a set of crudely-vented expansion brackets.

The right side panel, on the other hand, is much more interesting.

Here, you'll find a large 140mm fan in a circular grilled mount sitting just proud of the panel. It's got a kind of turbine feel to it – combined with the split side-panel it delivers a real industrial vibe that the rest of the case design compliments nicely. On the top is another grill, albeit without a fan. Sadly, neither

the side grill nor top mount have filtering material – quite an oversight, in our opinion.

With the panel off, the main selling point of the case is revealed – it's red! Sadly, not an anodised red, but a rather watery, painted on red. Still, it makes for a striking contrast with all the black case components, and clever build choices would make for a wonderfully striking case interior – this would be a great case for serious AMD video card fans!

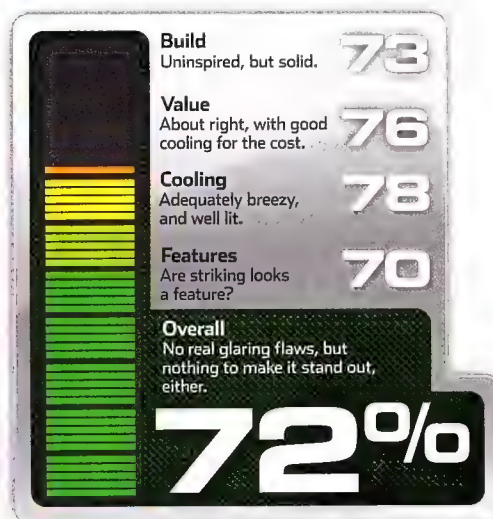
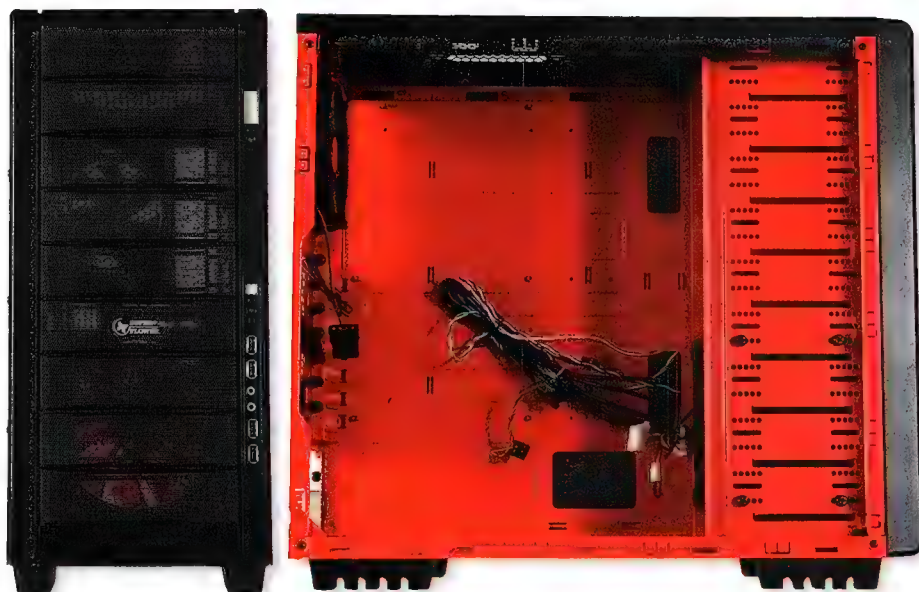
However, while quite bright, the interior is also quite plain. There's a distinct lack of rounded finishes on most of the metal edges, and no tool-less options to be seen. There's a hint of sound-dampening in play, but only a hint – there are some thin rubber supports for the PSU, and some rubber lining in the handily removable HDD cage. This same cage also has a red LED-lit 140mm fan mounted on it, rather than directly onto the front fascia.

Similarly, cable-management is only hinted at. There are two cable cut outs on the right of the motherboard plate, but there's not quite enough room to make full use of them. There's also no



CPU cut-out, so installing new heatsinks/CPUs is going to be a real chore.

Ultimately, for all its striking looks and theming possibilities, there's just not enough to recommend the SF-800 as a true enthusiast case. For a shiny project more interested in looks than power or cooling, it might suffice, but even then only if you like the colour red. The price is good enough, especially with the larger than usual fans, but for just a bit more you'll find far better cases. DH





# Antec Lanboy Air

Can this truly modular case deliver truly airy and dust-free computing?

Street Price \$220 Supplier Altech

Website [www.antec.com](http://www.antec.com)

**Specifications** 518 x 222 x 490mm (H x W x D); 2x 120mm fan (front), 2x 120mm fans (left panel), 1x 120mm fan (rear panel); 3x 5.25in drive bays (external), 6x 3.5in drive bays (internal), 2x 2.5in drive bays (internal); 8x expansion slots; 9kg; ATX, mATX; steel and plastic construction.

**W**ell, here's a case that's caused quite a stir in the Atomic labs. We're as prone to strong feelings as anyone – there are brands we like, aesthetic beliefs we cleave to, and we're generally passionate about all things tech. But Antec's Lanboy Air has truly inspired some strong opinions.

In a very real sense, this is a case you're either going to love without reservation, or hate. And I mean really hate.

## A case for James May

The best way to describe the Lanboy is as some sort of cross between Antec's Skeleton case and a Meccano set. The frame, the chassis and panels rest upon is part of the



To call the design striking is a massive understatement. It's bold, hewing as far from conventional tower design as is possible ...

external structure, and being coloured bright construction site yellow (there's a blue option as well) makes this quite the standout. Every surface is either perforated, slashed or – in some cases – open to the air.

To call the design striking is a massive understatement. It's bold, hewing as far from conventional tower design as is possible within the framework of an upright form factor. But there's also method to the seeming mad design.

Look closely, and you'll see that not one of those meshed panels – top, sides, bottom front or rear – has a dust filter. Rather, the Lanboy relies upon its five pre-installed fans to draw air into the case and create positive external pressure. In theory, this creates a constant outflow of air across every case surface, and will let dust out as freely as it lets dust in.

It's a great idea, but in practice it's only as good as the build you house in the case. If your cabling is lazy, or you've not taken note of the main paths of airflow, you'll end up with an inevitable dust and gunk build-up on loose cables and components. But with a bit of care and forethought, this dust-in/dust-out design should work a treat.

The other pillar of the Lanboy's design is true modularity, and this is another area that's split Atomic opinion. Pretty much every panel, support or case component is secured by easy to access screws – there are almost no riveted components. It's quite possible to take the case apart entirely – great news if you have a really outré mod you want to experiment with, or if you want to colour the case panels and parts to your own specs.



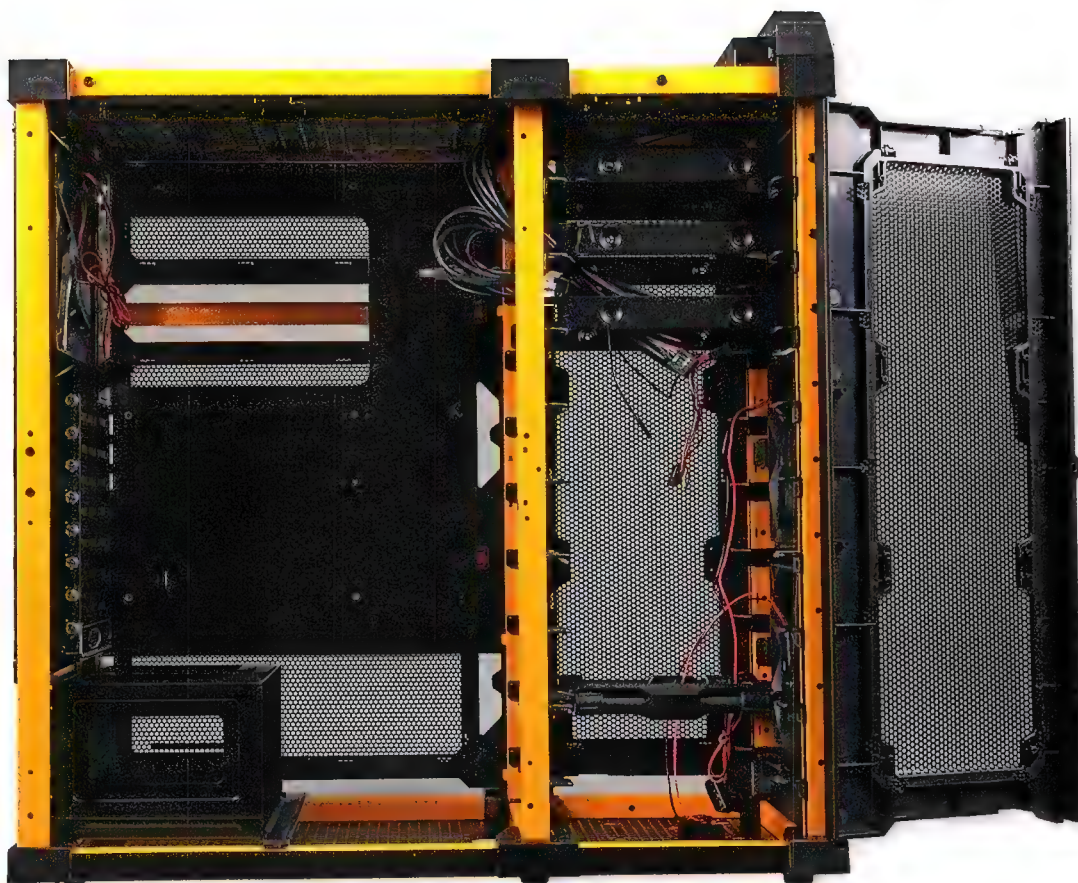
Similarly, case parts, like the side-panels, which would normally be a single part, are multipart designs. There are two side-panels per side, for instance – one covering the mobo and psu, the other a swinging door over the drive bays. Sure, this makes things a bit fiddly during the initial system build (especially considering the six screws securing main sidepanel), but post-build upgrade and modification then becomes much easier. In particular, managing the HDD bays can be done without the need to take off the side-panel and disconnect the case fans in that panel.

Very clever stuff.

## Going deeper

The case interior of the Lanbox is just as exciting. As you can probably tell, we come down firmly on the side of really liking the design ethic behind the case. For instance, the HDD bays use a truly unique method to keep your drives secure, silent and vibration dampened. Antec calls it the AirMount system – it combines a traditional set of screw-on brackets with a length of rubber cord hooked onto the case, literally suspending your HDDs in the air.

It seems counter-intuitive, but given you're not going to be slinging the case around while in use, it's ingenious. The rubber cords are quite rigid when properly mounted, too. Solid state drives, however, screw right onto the bottom plate of the case, while optical and larger drives rely on traditional screws, as do the expansion slots.



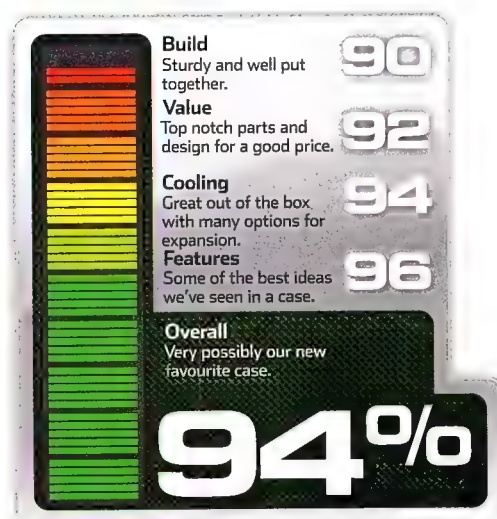
What we like about this is that Antec's not gone over the top on tool-less designs when a simple screw does a much better job. It's an elegant amount of engineering.

The PSU mount is a removable caddy, and the motherboard plate can also slide out. There's a mess of room behind the plate to stow cables, too, so getting that perfect airflow should be easy. And, if you need it, there are two more fan mounts on the top of the case, and all of the pre-installed fans are adjustable – the front in fans in particular feature external dial controls.

## On the move

With two sturdy handles on top, this is a case that lives up to its name. It looks striking, and even if you don't like it, we guarantee that you can't ignore it. Plus, the modding options are wide open – we think it would look particularly good with a mess of case lights installed; the backlit mesh would deliver a hyper-industrial look.

And all while keep your rig running cool and as quiet as possible. Good job, Antec. Truly outside the box thinking. **DH**





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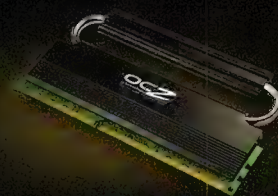
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# Coolermaster Elite

The maker of some of our favourite cases goes ultra-cheap – cause for celebration or concern?

**Street Price** \$65 **Supplier** CoolerMaster  
**Website** [www.coolermaster.com](http://www.coolermaster.com)

**Specifications** 190 x 424 x 490mm (W x H x D); 1x 120mm fan (front); 3x 5.25in drive bays (external), 2x 3.5in drive bays (external), 5x 3.5in drive bays (internal); 7x expansions slots; 4.7kg; 2x USB 2, 1x mic, 1x audio; steel and plastic construction.

**W**e make no bones about the fact that CoolerMaster is one of our favourite case brands. We've reviewed, loved and, in some cases, continue to use models like the HAF series, and the various CM 690s. Even the Sniper and Scout cases are not without their charms. So, of course we were curious about what kind of case CoolerMaster might deliver to the lower end of the market. That's where the Elite comes in – it's a sub-hundred case which promises all kinds of awesome on its box... but delivers almost nothing to make us think of looking at it twice.

The feeling of hardware ennui begins at first glance. The bulk of the case is made from the same thin, textured steel that cases have been made from since time immemorial, but in this incarnation it's even lighter and flimsier. In all seriousness, a stiff breeze could make the case move – especially with the seemingly frictionless feet keeping the case only roughly upright.

There's a cheap side-panel secured to the right-hand panel by plastic rivets (shudder...), a very plain rear panel, a fairly standard mesh-covered fascia, and a grilled upper mount for two 120mm fans.

CoolerMaster claims all these panels are filtered to protect your machine's precious innards from dust, but that's mostly a porky. In

reality, the upper mount is only protected by a flimsy plastic grill that's merely going to trap larger dust while letting smaller particles frolic on into the case. On the front panel, only some of the grill inserts have actual filter material – the rest feature only the lame plastic stuff. It's even worse on the lower PSU grill, where there are two grill mounts, only one of which has a filter, and even then it's that same useless plastic.

Of course, with just one fan included in the case as standard, you're not going to get that much dust sucked in here at all. That said, it is mounted where there's no actual filter material...

Taking off the side panel for closer inspection just makes us feel even more glum. The black interior is nice enough, but it's the details that depress. For instance, the promise of tool-less drive bays is only true of five of the available bays – the rest are very much tool-intensive. And those tool-less bays use arguably the most rickety mechanics we've yet seen. There's also not a hint or even attempt at vibration dampening. We know this is a cheap case, but when you think of its overall lightness, the flimsy enclosures, and the lack of soundproofing, it's going to roar like a tiger in operation.

And not in a good way.

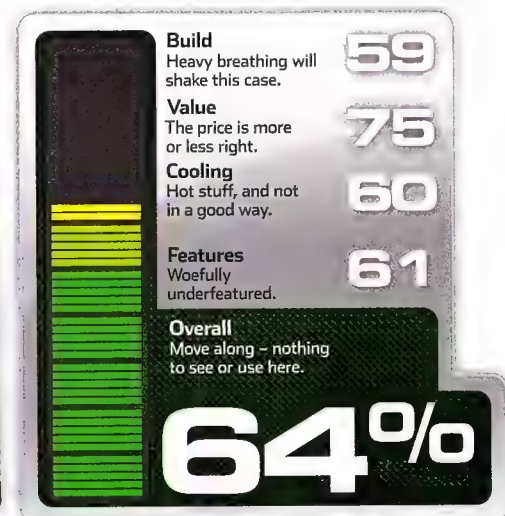
Finally, there are the expansions brackets. Both these and the so-called water cooling retainers are stamped into the case's shell.



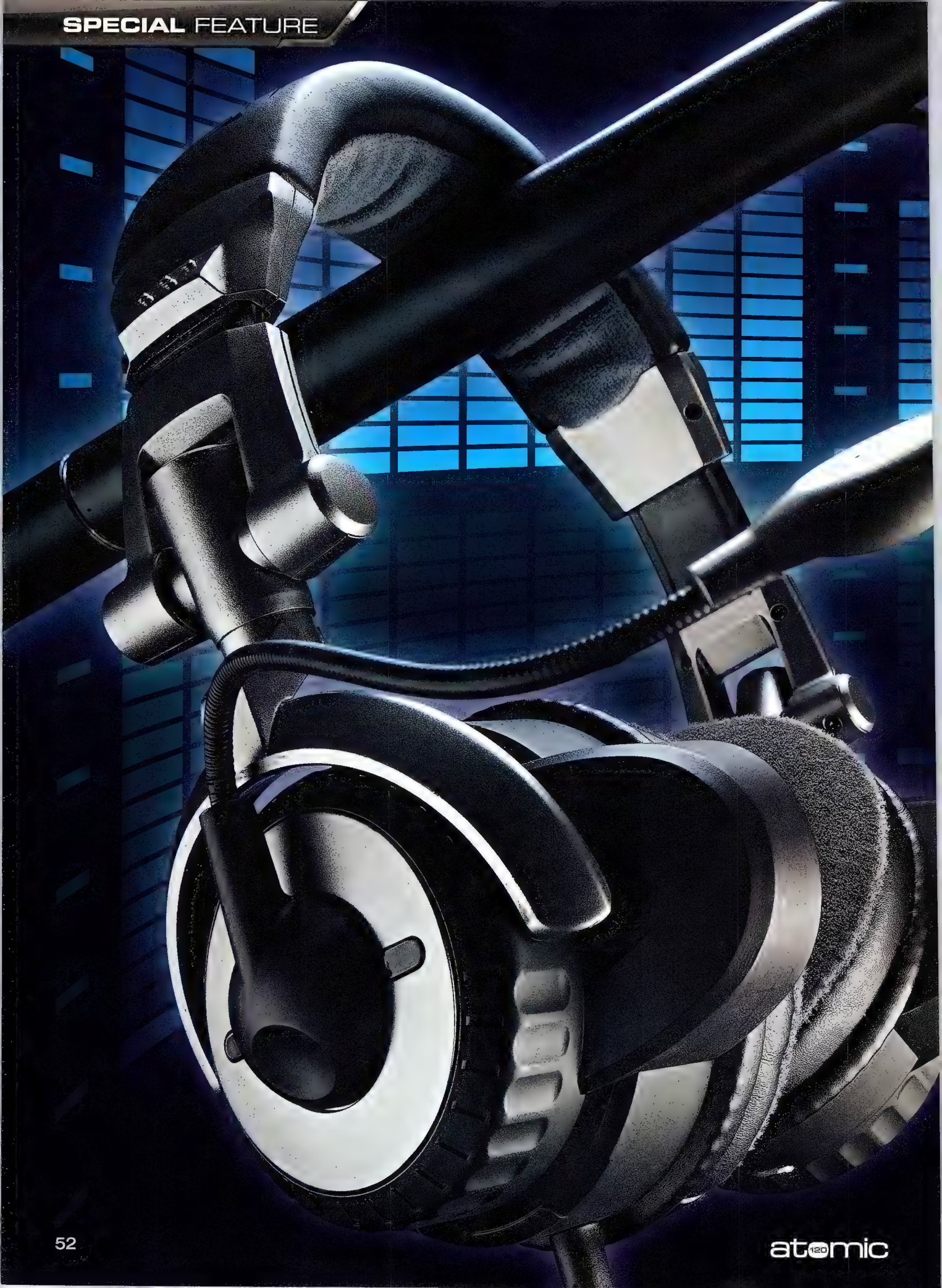
You'll need to punch them out with a screwdriver or your sense of rage before use, and they're not replaceable. And when we consider the wear this kind of behaviour would have on an external cooling loop... \*shudder\*.

At least there's a CPU cutout on the motherboard tray, but that's small beer at this stage.

All things considered, you're getting what you pay for. We'd be much less cranky about the Elite, however, if CoolerMaster hadn't tried to talk up the cooling and filtering options so much – it's just outright wrong-headed marketing. And more's the pity if some upcoming enthusiast listens to their claims. **DH**











# Get your head in the GAME

**Antony Leather** clamps his ears between six gaming headsets to find the perfect frag-enabling pair.

**T**here are many reasons why a gaming headset can be a great addition to your PC. Games, music and videos can often sound more immersive with decent headphones than with a good set of speakers, especially if your PC is located in a noisy environment.

Believe it or not, not everyone around you will be able to hear your epic gaming moments without cringing at the sheer amount of competitiveness and sportspersonship pouring off you, so a

gaming headset is a great way to keep those around you from feeling inadequate, or annoyed, in your presence.

Gaming headsets also give you the ability to speak to team-mates, which adds a huge amount of fun and realism to online or multiplayer games, since you're able to coordinate your actions – as well as make fun of those who have been brutally defeated by another of your headshots. To give you the best chance of awing those around with your ability to hear their footsteps from

halfway across the map, we've selected eight of the latest headsets: featuring a mix of booming bass and virtual surround sound; then pummelled our eardrums with grenade bursts for hours on end to see which is worth your cash.

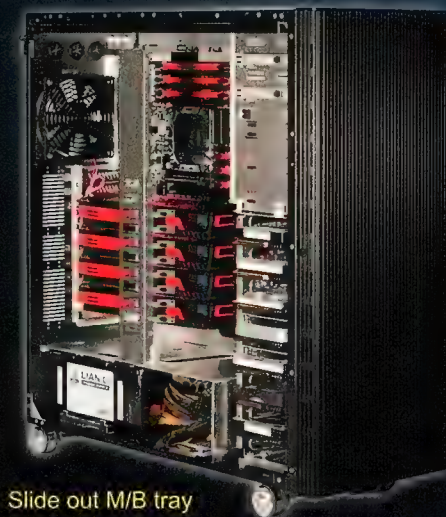
Whether you want a way to grab some sneaky silent gaming sessions, some aggressive knife-fighting screaming matches, or you're simply after an alternative to speakers, the next few pages are definitely essential reading.



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PCI: 11 Slots**

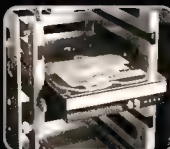


Slide out M/B tray

## PC-V2120

Bay: 5.25" x5, (Can be convert to 3.5" internal x 3),  
3.5" internal x10 (Can be convert to 2.5" x 5), 2.5" internal x 2  
M/B: HPTX / E-ATX / ATX (Slide out M/B tray)  
Fan: 3 x 140mm, 2 x 120mm  
I/O Ports: USB 3.0 x 4 / E-SATA x 1 / HD Audio  
Dim.: 235 x 620 x 635mm (W, H, D)  
PCI: 11 Slots  
Color: Silver / Black / All Black

**SILENT**



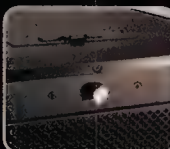
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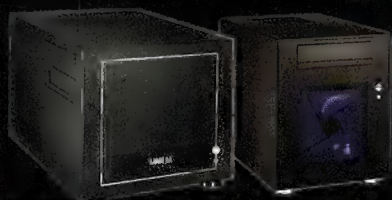
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PC-V2120

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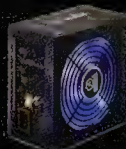
**PC-8N**  
Bay: 5.25" x 4, 3.5" x 1,  
3.5" internal x 3  
2.5" internal x 1  
M/B: ATX, M-ATX  
Fan: 2 x 120mm  
Dim: 210 x 450 x 490 (W, H, D)



**PC-V352B**  
Bay: 5.25" x 2, 3.5" x 1,  
3.5" internal x3  
M/B: M-ATX, Mini ITX  
Fan: 2 x 120mm, 1 x 80mm  
I/O: USB3.0 x 2, E-SATA, HD Audio  
Color: red / black / silver

**PC-Q08**  
Bay: 5.25" x1, 3.5" internal x6  
2.5" x 1  
M/B: Mini ITX  
Fan: 1 x 120mm, 1 x 140mm  
I/O: USB3.0 x2, HD Audio  
Color: red / black / silver

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Bay: Slim ODD x1, 3.5" internal x1  
M/B: Mini ITX  
Dim: 520 x 300 x 485mm  
Color: red / black / silver



Bay: 5.25" x 2, 3.5" x 3, 2.5" x 2  
M/B: ATX / M-ATX  
PCI: 8 slots  
Size: 351 x 330 x 400mm  
Color: red / black / silver  
Optional: USB3.0 x2, E-SATA, HD Audio

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## Sennheiser PC 333D

An expensive set of cans that leaves us wanting.

**Street Price** \$250 **Product page** <http://goo.gl/kgoWn>

**Specifications** 2m cable; 30mm drivers, 14-22000Hz response; noise-cancelling captive boom mic, 70-15000Hz response; 112dB SPL; 255g weight; USB 3D G4ME included.

At \$250, the PC 333D has a lot to prove – especially against cheaper headsets. It features a closed design and the ear cushions are covered in a soft, plastic housing that reduces sound leakage.

However, the low leakage is probably also due to the tight grip the PC 333D has on your head – it's far from comfortable, and despite the cups being circumaural, the cushions didn't fully clear our averagely sized ears. The headband is tight too, resulting in a dull ache after prolonged use.

The microphone takes the form of a pull-down boom, while the right ear cup has a dial for volume control. Included in the box are a handy carry pouch and a 3D G4ME 7.1 USB sound adapter. This provides virtual 7.1 surround sound; nicer than onboard mobo sound, but not as good as a sound card.

Listening to music made it clear that the PC 333D has rich and varied bass, and also

plenty of flexibility at the higher end. However, mid-tones – especially voices and general filler sounds – were flat and a little lifeless, especially when compared with the Razer Carcharias. Using the included USB adapter resulted in better sound-staging, with a more detailed sense of our surroundings, but this was only useful in games and didn't add a lot on top of the standard stereo mode. Mid-tones were also flat in movies, with voices fading too much into the general banter, while the 7.1 surround mode didn't add a great deal more compared to the clear and punchy stereo mode.

While the PC 333D has plenty of accurate bass, it doesn't score highly in many other areas.

Given that it isn't very comfortable, nor very inspiring on the audio front, we can't recommend buying it.



### Overall

Smaller drivers and a higher price mean this is a headset to avoid.

**55%**



The 7H is SteelSeries' new flagship headset and retails for a reasonable \$150. SteelSeries claims to have focused on improving sound quality, particularly bass tones – something that was definitely lacking in their earlier units.

The 7H is equipped with 50mm drivers, and its stated frequency response range is way beyond that of the competition at 18-28,000Hz; many other headsets state a range of up to only 20,000Hz. Of course, given the the human hearing range is supposed to be 20-20,000Hz, that's perfectly understandable – but this is great if you're a bat!

A retractable, pose-able microphone boom extends from the left earpiece, and there's an inline remote with a volume control and a microphone toggle. The 3m cable is braided to reduce snagging, and there's an additional set of porous ear cushions for comfort. These are a little softer on the ears, but let more sound in and out, which could be a problem at noisier LANs.

The 7H is very light and provides an extremely snug fit with its circumaural ear cushions. With a closed design, sound leakage is practically eliminated in its stock configuration. The grip is very tight, though, and many of us found that it became uncomfortable after long periods of time. The 7H can be broken down into five parts – ear cushions, ear cups and headband, with the braided cable also being detachable for easy

## SteelSeries 7H

Like dipping your ears in a shallow pool.

**Street Price** \$150 **Product page** <http://goo.gl/UQsv3>

**Specifications** 3m cable with in-line volume control box; 50mm drivers, 18-28000Hz response; retractable captive boom mic, 50-16000Hz response; 112dB SPL; approx. 550g weight; folding design.

transportation. Our 7H had standard 3.5mm mini-jacks, but there's also a USB version available.

Despite having a good bass line in pop music, the 7H also produced remarkably detailed high-frequency sounds, with crisp guitar notes and silky, clear vocals. However, while films and rock music were generally good and the bass was powerful, the sound lacked depth compared to the awesome Razer Carcharias. Games were a similar story, and the 7H left us feeling quite flat.

### Overall

Punchy bass and great response; a little utilitarian.

**71%**



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## Roccat Kave

Good sound is hard to find.

**Street Price** \$145 **Product page** <http://goo.gl/Ogr6h>

**Specifications** 2m cable with volume control box; 40mm drivers, 20-20,000Hz response; removable boom mic, 20-18,000Hz response; 114dB SPL; unknown weight; folding design; USB amp.

The Roccat Kave is a 5.1-channel surround-sound headset that taps into your existing sound card's outputs. The large audio controller requires a USB connection for power. This inline 4-channel controller is essentially an amplifier, and can adjust the volume of the centre, front and rear channels, as well as the subwoofer.

There's also a toggle for Game or Movie modes, although we could barely discern any difference between the two. However, there's no way to remove the controller, so if you find it cumbersome or prefer dealing with the controls on your PC, you're stuck.

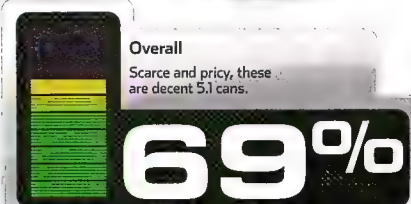
Each cup is equipped with front and rear 40mm drivers. The cups themselves are circumaural and closed, with relatively soft cushions that easily clear your ears. However, the headset is fairly heavy, so it isn't particularly comfortable for long stretches.

Sound quality was excellent and the

surround sound was capable, although it's no replacement for 5.1 speakers. The Kave takes a while to set up, and some channels were still too loud or too quiet, even after plenty of fiddling. Music sounded good, but exhibited some echoing that we couldn't trim out. Frequency response was excellent and the bass was punchy. However, the overall experience was let down by an annoying echoing that reduced crispness.

Games were more forgiving, with plenty of detail and less echoing. The effective bass served the Kave well, and the surround sound was certainly more useful than stereo at locating enemies. Movies were well catered for with the surround sound, although again, the echoing noise took the edge off an otherwise great experience. If you have sensitive neighbours or not enough room for speakers then the Kave isn't a bad way to experience films in 5.1 surround-sound.

The Kave is hard to find in Australia, and once you do find it, it's a pain to set up. If you need 5.1 though, this could be the set for you.



## Razer Megalodon

A Carcharias-in-a-box.

**Street Price** \$190 **Product page** <http://goo.gl/H2eFs>

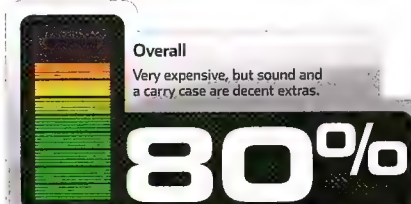
**Specifications** 3.3m cable with volume control box; 40mm drivers, 20-20,000Hz response; captive noise-filtering boom mic, 50-16,000Hz response; 102dB SPL; unknown weight; USB 'Maelstrom Audio Engine'; hard carry case.

engine – essentially an external virtual 7.1-channel sound card. It provides volume and bass control in 2-channel mode; in 7.1 channel mode, it provides discrete controls for the centre, side and rear volume. There's also a microphone sensitivity control and a mute button. The controls are well designed, very easy to use.

Unlike the SteelSeries 7H, the Megalodon doesn't exert excessive pressure on your head, instead providing a gentle, even grip. It leaked sound pretty badly, however. In games, using the 2-channel mode, the Megalodon performed similarly to the Carcharias, with a great range of sound produced crisply and cleanly. It excelled with rich and varied bass; full of detail, if a fraction on the weak side. Switching to 7.1-channel mode resulted in the best virtual surround-sound experience we've had, with far more going on around us than in the 2-channel mode. There was a little echoing, but this is usual with virtual surround-sound methods, including Creative's CMSS-3D.

Music sounded much better in 2-channel mode and it was handy having bass control at our fingertips. Movies again produced some echoing with the 7.1-channel mode and we preferred the 2-channel mode.

On-board sound can be poor and suffers from electronic noise as well as placing a load on your CPU. But if your PC can't accommodate a sound card and you rarely use your speakers, then it's definitely worth considering.



The Megalodon is Razer's flagship gaming headset. However, it's nearly identical to the cheaper Carcharias, featuring the same headband, ear cups, 40mm drivers and stated frequency response range. The Megalodon also comes with a huge inline control box called the Maelstrom Audio

control box. It provides volume and bass control in 2-channel mode; in 7.1 channel mode, it provides discrete controls for the centre, side and rear volume. There's also a microphone sensitivity control and a mute button. The controls are well designed, very easy to use.



## Razer Carcharias

Headphones with a powerful bite.

**Street Price** \$108 **Product page** <http://goo.gl/HNFTPT>

**Specifications** 3m cable with volume control box; 40mm drivers, 20-20,000Hz response; captive noise-filtering boom mic, 50-16,000Hz response; 102dB SPL; unknown weight.

The Razer Carcharias, which is named after the infamous Great White Shark, (*carcharodon carcharias*), is practically the same headset as the much more expensive Megalodon – they have the same headband and ear cups, 40mm drivers and stated frequency response range. The main difference is the inline remote; the Carcharias has simple volume and microphone adjustment controls whereas the Megalodon has the Maelstrom Audio Engine, which is essentially an external 7.1-channel sound card. The latter also connects via USB, while the Carcharias uses standard 3.5mm headphone and microphone jacks at the end of a 3m braided cable.

The Razer headsets were the best of the bunch when it came to comfort, with their circumaural ear cushions providing a perfect fit that didn't press too much on our heads. They leaked a little sound, but only at high

volumes, which is a price worth paying for such epic comfort.

In games, the Carcharias produced a superb range of throaty bass tones while providing clear mid- and high-end tones. Music was fantastic, with riffs that were clear and rich from top to bottom, although it lacked the booming bass of the SteelSeries 7H.

Movies were a similar story, although the Carcharias gained ground here with its brilliant range in the low end that displayed clear and discernible differences. This made booming cannon fire and explosions a downright pleasure.

The choice between the Carcharias and Megalodon really comes down to whether or not you have a discrete sound card in your PC. If you do, there's little point in opting for the Megalodon, as the cheaper Carcharias performed admirably. The Carcharias doesn't have the booming bass of the SteelSeries 7H, but it deals with low-level bass sounds well enough and is far more comfortable to wear. As such, it's a great gaming headset that'll sit well with any gamer.



atomic  
APPROVED

## Plantronics GameCom 777

Low price doesn't mean low performance.

**Street Price** \$80 **Product page** <http://goo.gl/wwN2T>

**Specifications** 2m cable with volume control box; 40mm drivers, 20-20,000Hz response; captive noise-cancelling boom mic, unknown response; unknown SPL; unknown weight; USB 5.1 adaptor.

cup cushions are quite comfortable.

The cups, which house 40mm drivers, are open-backed so that noise flows freely to and from the outside world. This is popular on professional headsets, as it allows for more accurate sound. However, the downside is noise leakage and weak bass; it also lets in external noise, which may be a problem.

The GameCom 777 connects via 3.5mm headphone and microphone jacks, and has an inline volume control and microphone toggle. However, the included USB dongle allows you to use it as a USB headset – which some people may find more convenient – and also works as a virtual 5.1 surround-sound adaptor.

The GameCom 777 put on a good show in all our tests, with movies and games in particular proving to be crisp and punchy. Movies didn't take kindly to the surround-sound adaptor, however, with the audio sounding murky. Games sounded more realistic with the adaptor, especially *Race Driver: GRID*, which had its audio so transformed that we felt as

The GameCom 777 is Plantronics' current flagship gaming headset. It feels very sturdy yet fairly light, and has a pull-down microphone that slots away neatly.

The headset has ample padding and plenty of adjustment in the headband to ensure a comfortable fit. The ear cups exert a very tight grip on bigger heads, though the circumaural

though we were sitting in the cockpit. The virtual surround-sound adaptor had a similar effect to that of Creative's CMSS-3D on music, making it sound as though you were listening to audio in an echo-prone cave. In short, it sounded better with the adaptor switched off.

The GameCom 777 has absolutely superb bass, and its mid- and high-end tones are great – though the adaptor is only really useful in games. As a result, with a price of only \$80, we wholeheartedly recommend it.

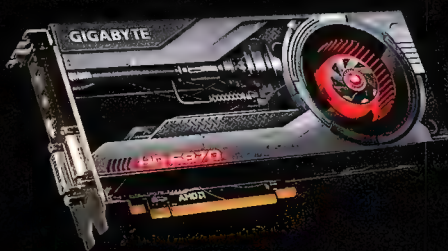




## IMAGINATION UNLEASHED

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ANTI-TURBULENCE COOLING



### GV-R687D5-1GD-B

- Powered by AMD Radeon HD 6870 GPU
- Supports PCI Express 2.1
- Microsoft DirectX 11 and OpenGL 4.1\* support
- Integrated with the first 1GB GDDR5 memory and 256-bit memory interface
- Supports CrossFireX™ and Avivo™ HD technology
- Features Dual-link DVI-I / DVI-D / D-sub (By adapter) / HDMI / mini Displayport

\*NOTE: OpenGL 4.1: Driver support scheduled for 2011



### GV-R685D5-1GD

- Powered by AMD Radeon HD 6850 GPU
- Supports PCI Express 2.1
- Microsoft DirectX 11 and OpenGL 4.1\* support
- Integrated with the first 1GB GDDR5 memory and 256-bit memory interface
- Supports CrossFireX™ and Avivo™ HD technology
- Features Dual-link DVI-I / DVI-D / D-sub (By adapter) / HDMI / Displayport
- GIGABYTE WINDFORCE 2X Cooling Design

\*NOTE: OpenGL 4.1: Driver support scheduled for 2011



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- Dust reduction
- Long life span
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### Function

### Fan Action

**GPU above  
70°C**

- Both fans automatically spin to prevent overheating

- Both fans automatically spin to prevent overheating



# KITLOG

These are our four basic systems, with something for every taste. On this page, **The Game Box** is put together with money-saving in mind, but also an eye to getting as much bang for buck. It's the best value system for those who want a lot of processing grunt, but who don't want to sacrifice the upgradeability or compatibility that is so important. Intel's going to keep the P55 socket around for quite some time, so making the leap to this new platform is well-timed.

If you're going to spend money on a beast that generates pixels, you might as well spend a little more and get a screen that shows those pixels in their best light. This screen is that beast, and the 24 inches of colour-accurate screen boast a response time that will give you each sultry frame just as the game designer or movie director intended. Definitely a toy worth saving up for.

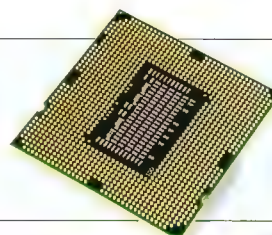


**The Perfect PC**, on the other hand, is the system everyone aspires to, with nothing but the best parts – without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Oh, and if you're wondering what the Ref IDs are, that's the ID of that article on our website. Just enter it like this – [www.atomicmpc.com.au/?NUMBER](http://www.atomicmpc.com.au/?NUMBER) – and you'll go straight to that review.

## THE GAME BOX

CPU



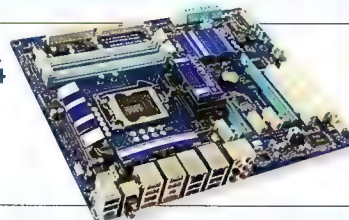
**Intel Core i5 760**  
PRICE \$245

Intel's budget quad is more than you'll need in a chip – now even faster!

MOTHERBOARD

**GIGABYTE P55A-UD4**  
PRICE \$225

A great value P55 board with some nice features.



MEMORY



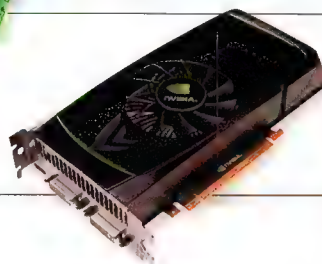
**G.Skill Ripjaws F3-10666CL7D-4GBRH**  
PRICE \$130

Great value, tight timings, and some flexibility.

VIDEOCARD

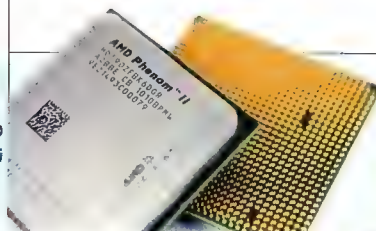
**NVIDIA GTX460**  
PRICE \$245

A reference-design card, but plenty fast for gaming bliss.  
*Issue 116, Page 38*



## THE PERFECT PC

CPU



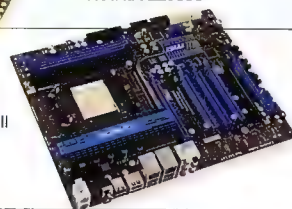
**AMD Phenom II X6 1090T**  
PRICE \$355

Six cores of high-powered processing joy.  
*Ref ID: 220395*

MOTHERBOARD

**MSI 890FXA-GD70**  
PRICE \$265

A high-end AMD platform with full CrossFire support, great OC'er.  
*Ref ID: 221656*



MEMORY



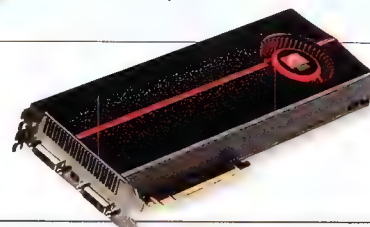
**Corsair Dominator GT CMT4GX3M2A2000C8**  
PRICE \$220

Red-hot memory for dual-channel speed.

VIDEOCARD

**ATI 5970**  
PRICE \$780

A dual-cored DX11 beast, the most powerful yet.  
*Ref ID: 173167*





For more builds check out the Kitlog E-mag at [atomicmpc.com.au/kitlog](http://atomicmpc.com.au/kitlog)

**SUBTOTAL: \$1660**



### Coolermaster Hyper 212

PRICE \$45

Nice cooling for a very affordable price.

CASE



### Lancool Dragonlord PC-K62

PRICE \$165

Vibration dampened, great cooling and sexy looks.

Ref ID: 160151

### 1TB HDD

PRICE \$90

A thousand gigabyte storage drive on the cheap.



KEYBOARD

### Razer Arctosa

PRICE \$50

A cool-looking keyboard that'll serve you very well.

Ref ID: 149483



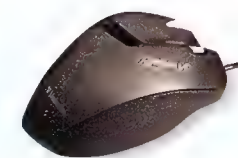
### Viewsonic VX2233WM

PRICE \$215

21.5 inches of value-packed screen, great buy.

Issue 106, Page 42

MOUSE



### Verbatim Rapier V1

PRICE \$65

Great gaming performance and nifty features.

Issue 96, Page 43

### Plantronics Gamecom 777

PRICE \$80

Solid set of cans with great audio.

Issue 101, Page 41



### Onboard Realtek ALC889A

A decent chip that does the job.

POWER SUPPLY

### OCZ ModXStream Pro 600W

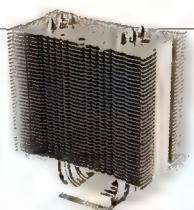
PRICE \$105

Plenty of wattage, reliable, modular for neatness.

Issue 109, Page 59



**SUBTOTAL: \$4739**



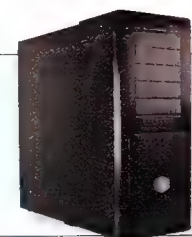
### Noctua NH-U12P SE2

PRICE \$95

Two fans, quiet and nice overclocking capacity.

Issue 107, Page 48

CASE



### Coolermaster ATCS 840

PRICE \$370

Heaps of fans, plenty of space, and dripping with quality.

Ref ID: 132479

### OCZ Vertex 2 100GB & WD 600GB VelociRaptor

PRICE \$470 + \$400

Superfast SSD with zippy storage.

OCZ Ref ID: 219218

WD Ref ID: 220323



KEYBOARD

### Microsoft Sidewinder X6

PRICE \$95

Backlit, sturdy, magnetic numpad & macro keys; what's not to like?

Ref ID: 129535



### Dell U2410

PRICE \$699

In-Plane Switching, 1.07 billion colours and 24 inches.

MOUSE



### Microsoft Sidewinder X8 Wireless

PRICE \$105

Cable-less, comfortable, lag-free and fraggable!

Ref ID: 148422

### Logitech Z-5500D

PRICE \$400

Earth-shakingly good.

Ref ID: 22626

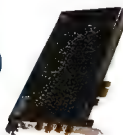


### Creative X-Fi Titanium HD

PRICE \$270

Seriously serious sound.

Issue 115, Page 47



POWER SUPPLY

### XFX 850W

PRICE \$215

Plenty of power, ultra-stable rails and a great price.

Issue 107, Page 50

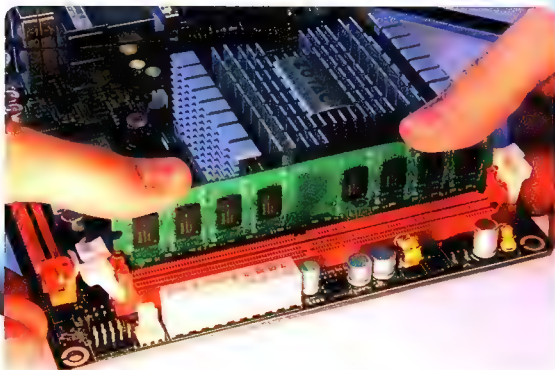




The **LAN Rig**, the ultimate in portable gaming power – go anywhere, frag anyone. No longer will you be tied to a desk or forced to awkwardly manhandle your full-sized rig, helped by a convenient handle and beefy tech. Perfect for wowing people at LANs, the tech inside is fast enough to run any game, and boasts enough speed to keep your game running at full clip even if other programs intrude in the background. After all, no-one wants to miss a headshot.

There are many benefits to running an ITX system, aside from the challenge of choosing compatible components, but here are just a few of the plusses:

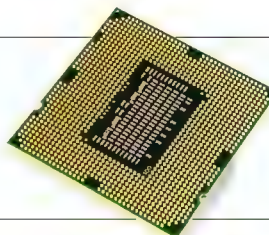
- Small footprint, so it'll fit damn near anywhere – even under a monitor.
- Lower power consumption due to restrained component choice.
- Generally low-noise due to the 'wind tunnel' design of most cases.
- Easily moveable around the house, or even taken to a mate's place – all you need is power and a screen.



Finally, for the more entertainment-minded – and really, that's all of us – there's **The Mini**, ready to play movies and music quietly and efficiently. The basic guts are fast enough for general tasks, and the IGP can handle High-Definition content. You can also choose from three entirely optional upgrades to suit your needs best: a graphics card for WoW, TV tuner to catch the game, or a Wireless card to sync without cables. The perfect energy-conscious build.

## THE LAN RIG

CPU



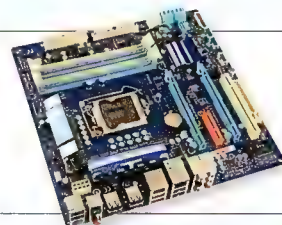
**Intel Core i5 760**  
PRICE \$245

Intel's budget quad is more than you'll need in a chip!  
*Issue 106, Page 36*

MOTHERBOARD

**GIGABYTE P55M-UD4**  
PRICE \$200

Great overclockability, nice value.  
*Issue 107, Page 40*



MEMORY



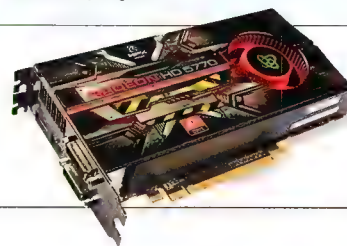
**G.Skill Ripjaws 2000MHz**  
PRICE \$190

Great value memory with amazing overclocking.  
*Issue 106, Page 52*

VIDEOCARD

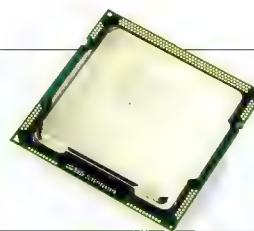
**ATI 5770**  
PRICE \$190

A decent value way to get into DX11.  
*Ref ID: 169775*



## THE MINI

CPU



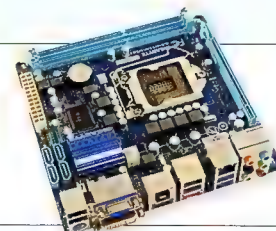
**Intel Core i3 530**  
PRICE \$140

Speedy dual-core with an IGP for HD video duties.

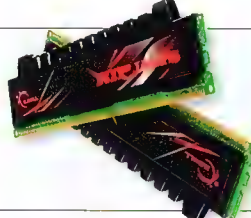
MOTHERBOARD

**GIGABYTE H55N-USB3**  
PRICE \$145

Tiny ITX form factor with up to 4 storage devices. Neat.  
*Issue 113, Page 39*



MEMORY



**G.Skill Ripjaws F3-10666CL7D-4GBRH**  
PRICE \$130

4GB of fast memory is plenty for running multiple HTPC media streaming apps.

VIDEOCARD

**ATI 5570 Low Profile**  
PRICE \$100

Graphical grunt in half the space. Enough for basic games, given the size.

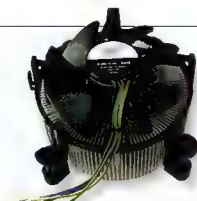




For more builds check out the Kitlog E-mag at [atomicmpc.com.au/kitlog](http://atomicmpc.com.au/kitlog)

**SUBTOTAL: \$1655**

COOLER



**Intel Stock Cooler**  
PRICE FREE

Does the job, fits under PSU well.

CASE



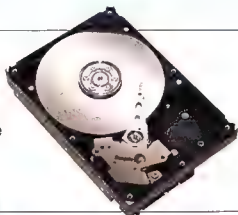
**Silverstone SG04**  
PRICE \$160

Small case with handle; add two 120mm fans for awesome cooling.  
*Ref ID: 148266*

SYSTEM DRIVE

**1TB HDD**  
PRICE \$90

A thousand gigabyte storage drive on the cheap.



KEYBOARD

**Razer Arctosa**  
PRICE \$50

A cool-looking keyboard that'll serve you very well.  
*Ref ID: 149483*



DISPLAY



**Viewsonic VX2233WM**  
PRICE \$215

21.5 inches of value-packed screen, great buy.  
*Issue 108, Page 42*

MOUSE



**Verbatim Rapier V1**  
PRICE \$65

Great gaming performance and nifty features.  
*Issue 96, Page 43*

AUDIO

**Plantronics Gamecom 777**  
PRICE \$80

Solid set of cans with great audio.  
*Issue 101, Page 41*



**Onboard Realtek ALC889A**

A decent chip that does the job.

POWER SUPPLY

**Corsair HX-520**  
PRICE \$140

Modular, efficient and keeps size manageable in cramped case.



**SUBTOTAL: \$1033**

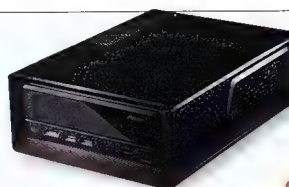
COOLER



**Scythe Big Shuriken**  
PRICE \$55

Tiny 58mm height, quieter than a sponge.

CASE



**Antec ISK 300-150**  
PRICE \$110

Included 150W PSU, good build quality, and decent airflow.

SYSTEM DRIVE

**WD Scorpio Blue 640GB**  
PRICE \$120

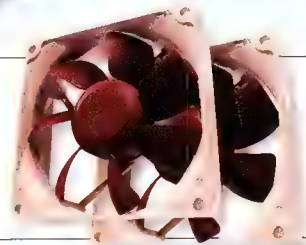
Fast 2.5" internal storage – grab two for more space!



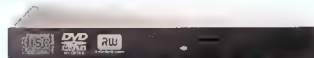
COOLING

**Noctua NF-R8**  
PRICE \$22 x 2

Get some quiet, positive flow in this mini build.



OPTICAL



**Lite-On DS-8A4S**  
PRICE \$70

Slim internal DVD drive for movies, installs or backups.

KEYBOARD



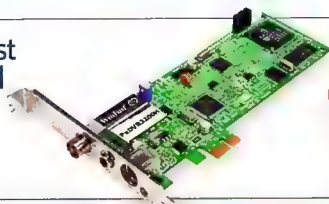
**Logitech diNovo Edge**  
PRICE \$199

Wireless board with a trackpad for mousing.

TV TUNER

**Leadtek Winfast PxDVR3200H**  
PRICE \$100

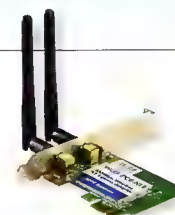
Get TV in your PC. H.264 recording ftw!



WIRELESS

**ASUS PCE-N13**  
PRICE \$45

Zippy 802.11N for wireless HD video streaming.







**European Gamers' case of choice**  
*Designed in Sweden*



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# Cannibalise the corpses!

**Dan Rutter digs through the trash to find precious... stuff.**

**L**andfill miners dig up the huge garbage-piles that modern society creates, and strip out the valuable stuff, like metals.

It's becoming a big business. Just as biodiesel has made used frying oil a saleable commodity, bulk garbage now has considerable value.

This makes perfect sense when you think about materials like aluminium, which is sometimes referred to as 'solidified electricity' thanks to its incredibly energy-intensive smelting process.

It takes a lot of energy to make a modern top-shelf game, too. Teams of coders and animators and texture artists and 3D modelers and motion-capturers and motion-capturees

failed new games and remaindered old games that could be given new life.

There are two reasons why this doesn't happen all over the place already.


One, the abovementioned compatibility problems. There's a reason why it's such a big deal when a game that's been in development for a couple of years changes to a new engine. Some resources are easy to convert, but even straightforward things like textures and sound effects can be surprisingly problematic, and AI and event scripting and model optimisation can be much worse.

But using resources from one game in an entirely different one is, often, perfectly practicable, and could be a huge time-saver.

suspected to make everyone else 7 per cent more likely to buy tickets.

I think the main problem may just be that game-makers aren't set up to do this sort of thing. They may give away their old games as free downloads, but dammit, Jim, we're programmers, not stock-photographers.

I still think this is a terrible waste, though. Many games are bland for the same reason that many blockbuster movies are empty and predictable: They cost so much to make that the creators only make products that're similar to previous successful products. Reduce the price with a bit of recycling, and you can afford to be more adventurous.

APB's character creator deserves to live on. We should probably leave *Daikatana* in the landfill, though. 

**...prying a 13-year game's awesome music loose from whoever now owns it may be difficult.**

and sound people and writers and who-knows-what-else spend years on end making a big-ticket game.

And then their Great New Game is launched... and, sometimes, it's a completely miserable failure.

Several recent big-name game-deaths were pretty predictable, on account of how making a new MMO that competes with *WoW* is like making a new auction site that competes with eBay. Even some of those games, though, thoroughly deserved to fail – *APB* is the perfect recent example.

What did everybody say about *APB*? "Excellent character creator, shame about the rest," right?

So why not take that character creator, and stick it onto the front of a better game?

Software isn't Lego, of course. If Rockstar decided to make all of the data for their *GTA IV* mini-NYC a free download, that wouldn't make it easy to use that data in another game.

But there are plenty of components from

It may not be financially sensible, though, because of the second problem: Intellectual-property death-grips.

If you want a grand stirring orchestral soundtrack for your military action game then the music from, say, *Total Annihilation*, would probably hit the spot. But prying a 13-year-old game's awesome music loose from whoever now owns it may well be more difficult than licensing a score from a 'production music' outfit, or licensing some classical music from an Eastern European orchestra, or indeed making a whole new score from scratch.

Music re-use is already common in the motion-picture world. Especially the motion-picture-trailer world. Most trailers come out before the movie they're promoting has a soundtrack at all, but even when the real soundtrack's already in the can, there's a surprisingly short list of Approved Trailer Soundtracks. Apparently it's acceptable for four dorks in the audience to say "Hey, that's the *Stargate* theme again!", if that music is

Dan will never end up on a trash heap.

[dan@atomicmpc.com.au](mailto:dan@atomicmpc.com.au)





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The Razor has cut away all the bulk, leaving customers with a chic, ultra, ultra slim cabinet measuring just 12.9mm

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**1 x ASUS 890FX Motherboard – valued at \$239**

Featuring The Three Unlockers: Disk Unlocker to fully utilise hard drives above 2.2Terabytes; Core Unlocker and Turbo Unlocker for performance boost and unlocking AMD processors.



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**1 x AMD Phenom II X6 processor 1100T – valued at \$299**

The AMD Phenom II X6 features new Turbo CORE technology that transfers performance to three dedicated cores operating at higher frequency.



**1 x Kingston HyperX T1 4GB Memory Kit – valued at \$175**

Featuring an all new heat sink construction, the HyperX T1 is capable of challenging the limits to deliver a new overclocking experience like never before.

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# TUTORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

**M**oney. It can't buy you love, but it does make the world go round. Or so the songs go. This month, it's also the subject of our atomic.edu – namely, how you can get some on the internet – and no, you don't need to send us your bank account details for this one (... although you're more than welcome to do so). Whether you can write or are handy with the html, there's money out there to be made, and more than that – you'll be building yourself a portfolio with every step.

And once you've earned it, we show you how *not* to spend it. In part two of our virtual server how-to, in which Chris Towbridge gives you some ideas of what you can do with your virtual happy place, once you've built it. And still, all for a grand total cost of sweet-fudge-all.

And if that's not enough, we also have all the best tweaks for F1 2010 so you don't have to overcapitalise on hardware to get yourself out on the track. Money? Earned. Money? Saved. Atomic? Awesome.



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## atomic WEEKLY NEWSLETTER

### Keep up with the latest from Atomic!

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# Making money online



Chris Taylor looks at the fine art of making money from the intarwebs.

The popularisation of the internet has made every 'man', theoretically, a publisher. Web sites and services that allow people to produce their own content are hugely successful: from the Angelfire and Geocities of days gone by to, now, Blogger and wikis. There are whole communities dedicated to sharing and critiquing amateur-made games, movies (including ones that involve naked people doing naked people stuff) and other content. Sadly, a lot of online content is crap. At a conservative estimate, 95 per cent of the web's content is utter rubbish. Not worth even a byte of the bandwidth it consumes. And a lot of it is unoriginal, too. You're likely to find the one piece of content in several (or several hundred) places.

Theoretically, it's possible to make money selling decent content. Theoretically. You've seen, we're sure, the ads. Make money online. A thousand dollars a day for little to no work. No skills or training required. Just click here to find out more – just, first, give us your name and address and banking details so we can steal your identity and your money and your megahertz.

Those kinds of profits are unrealistic. They're decidedly not what we have in mind when we say it's possible to make money online. Making money online is challenging but people do it. Some are so good at it that it's their primary source of income but we reckon that's a bit ambitious. Making any money is hard enough. There are lots of people online who will promise to pay you but simply won't. Still, if you can find a legitimate source, you may be able to sell skilfully produced content.

## Selling games

For starters, people buy games and other applications online. We mentioned a few months ago the possibility of selling your products through distribution channels such as the Apple App store. People download your product. You get some set percentage. The distributor – Apple or Valve or whoever – gets the rest. Some distribution channels will charge you to sell your content for you, but will essentially take care of all of your marketing for you. Such options are good if you're prepared to spend money and are producing software that's complex enough, interesting enough and good enough for it to have some sort of mass appeal but probably aren't so good if you're just making Flash and Java games.

People actually buy Flash and Java games. Not in the way they buy Apps for iPad, but for their own websites. They make the game



available for free and essentially use it, just like a free-to-air television programme, to get their audience to sit still while they assail them with advertisements. The advertisements are either on the website or embedded directly in the game itself. Some websites may seek out developers to come up with a game that directly promotes their products.

Rather than attempting to directly seek out web developers interested in your games, you should look for distribution channels that specialise in Flash games. FlashGameLicence, for example, links people who develop games with people who develop websites, including people who develop large Flash game portals. Understand that you won't make a lot of money and, sometimes, services such as FlashGameLicence are popular with Flash game developers. You'll need to ensure your games stand out from the pack. At the same time there will be myriad hoops for you to jump through. At a minimum, you'll most likely need to keep the size of the file small and bundle everything up in a single .swf file.

It does seem like a lot of effort for little or, perhaps, no monetary reward. There are advantages beyond the monetary, though. Every time we speak to games development studios about what they look for in potential employees, the response is pretty much the same. You need a qualification. You need people skills. You need to know what you're doing and like it. Above all, though, you need to be able to create something

that's fun for other people. Lots of people can create games – the internet, again, has made creating content and reaching some kind of audience easy – but very few can create games that are engaging to a large audience. And that, after all, is what commercial games development is all about. If you can create a game, even the simplest game, and distribute it and market it yourself and attain something of an audience, you're checking a big box so far as the human resources departments of lots of studios are concerned.

## Writing

It's possible, too, to make money writing articles. Services such as Helium, Textbroker and Constant Content publish articles themselves and/or sell articles to people with websites. The problem – for you, anyway – is that they pay their writers pretty poorly. Okay, if you're writing something highly specialised and you're good and you're lucky and you've sacrificed a virginal goat, you'll maybe get decent money – something in the ballpark of writing for a magazine. More likely, though, you'll make chicken scratch. There are lots of people writing for these services, many of them very happy with a dollar or two for a lengthy article, and, too – with writing, especially, this point is critical – there are lots of people online doing it for free. The prevalence of people willing to work hard for no return essentially devalues your product, if you're a writer of online content.



Still, though, writing online has its advantages. If you can pick up work reasonably frequently or, at least, some jobs that pay okay, you get a little bit of extra money. And too, you get your name in print. For some people, that in itself is enough – and may go some way to explaining the amount of people willing to pump out thousands of words for not even one cent. For others, your name in print (or on screen) is a step towards bigger and better things. You have published content you can show to the editors of magazines or large, reputable websites in the hopes of scoring some well-paying (hopefully) freelance contracts.

The article services employ a couple of different schemes when it comes to paying writers. A few will pay you up front and maybe throw you a little bit extra – and we do mean 'a little bit' – every time another, say, thousand people read your article. Others don't pay you anything up front but instead put you in touch with people who want specific articles written for specific articles within specific time frames. The people pay the article service a certain amount of money and you get a cut – maybe 70 per cent, maybe 50 per cent. If you have a unique skill set or knowledge base, you have potential to make a bit of money here.

Writing online is valuable experience for wannabe writers although it's worth keeping in mind the sort of writing that works in magazines and newspapers – and we're assuming that kind of work is what you want to end up doing

– doesn't usually work online. You must be clear and concise online. You must include the sort of key words that are likely to be entered into search engines. You will have little creative freedom if writing for article services. You'll be given a very specific brief, usually, and will get told where to go and how to get there if you don't follow it to the letter. As little as three such knock-backs can see you booted from an article service altogether.

## Developing websites

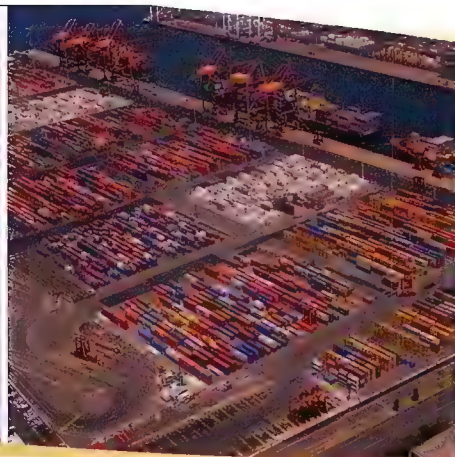
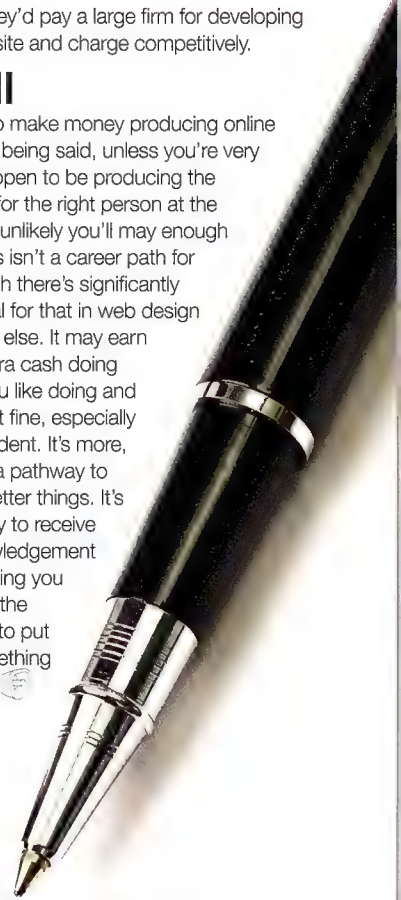
A tried and true method for making money online is to design websites. Again, it's highly competitive. Lots of people are doing it and, again, lots of people are doing it for free. It's also worthwhile if you're a student looking for a bit of extra cash or seeking to start or expand a portfolio that showcases your design work.

You can find jobs advertised online but a better starting point may be to look at the websites of small, local businesses and services. The websites for such businesses are often developed on-the-cheap or for free in the business owner's spare time and are hopelessly out-of-date. Some may not have websites at all but could benefit from having them. Directly approaching these businesses and convincing them of the advantages of either getting or updating a website can net you some (low-paying, most likely, but most likely easy) web design jobs. Base your pricing model off an established web design businesses: work out

how much they'd pay a large firm for developing a similar website and charge competitively.

## Overall

It's possible to make money producing online content. That being said, unless you're very lucky and happen to be producing the right content for the right person at the right time, it's unlikely you'll make enough to live off. This isn't a career path for most, although there's significantly more potential for that in web design than anything else. It may earn you some extra cash doing something you like doing and that's fine, just fine, especially if you're a student. It's more, as we see it, a pathway to bigger and better things. It's an opportunity to receive some acknowledgement doing something you want to do in the future, a way to put together something of a portfolio.



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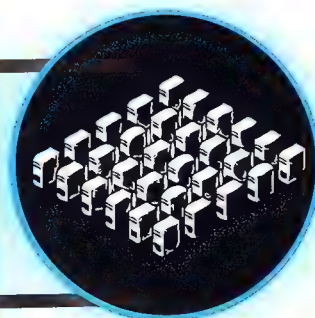
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# Creating Your Happy Place



## Part 2

# Creating a Free Virtual NAS Using ESXi and FreeNAS

Last month I described VMware's free ESXi hypervisor product and how to install and configure it for use. So, what can you do with your Virtual Happy Place?

**A**vid Atomicians will have read the feature in Issue 119 on the many NAS products available on the market today. These products are essentially a cut-down PC, usually running a flavour of embedded Linux with a friendly web-based interface on top to manage the show. The hardware these NAS boxes run on is usually very simple, with 16-bit CPUs and 512MB of RAM being commonplace. The hardware in your humble ESXi server is far superior to that, so why not create a NAS in a virtual machine (VM)?

FreeNAS is an open source project, designed to turn your obsolete PC into a NAS. It has the usual features of a basic NAS including sharing of files to Windows, Mac and UNIX. It can monitor a UPS, share a USB printer, be an iTunes server, and even handles those precious BitTorrents. Further, it is based on FreeBSD, which is noted for its stability and efficiency as a server. This makes it perfect for running in a VM as it requires very little in the way of resources and is very stable. The homepage for the project

is at <http://freenas.org>, where you will see there are 32- and 64-bit versions, as well as ISOs for running direct from CD or installing on your hard disk. There's even a pre-built FreeNAS Virtual Machine (VM) available, but that would be cheating wouldn't it?!

Let's create a FreeNAS server from scratch to

demonstrate how to configure a virtual machine. Time to put on a fresh brew...

## Installing FreeNAS

To begin this process you will need to start the vSphere client on your PC and log in to your ESXi server. Unless you've changed the default

### Steps to create a VM

Installing a new operating system in a VM consists of three main tasks:

1. Create a virtual machine for your OS.
2. Install the OS (and possibly the VMware tools if applicable).
3. Tweak ESXi to take care of the essentials like auto-starting it and reserving enough resources for it to run.

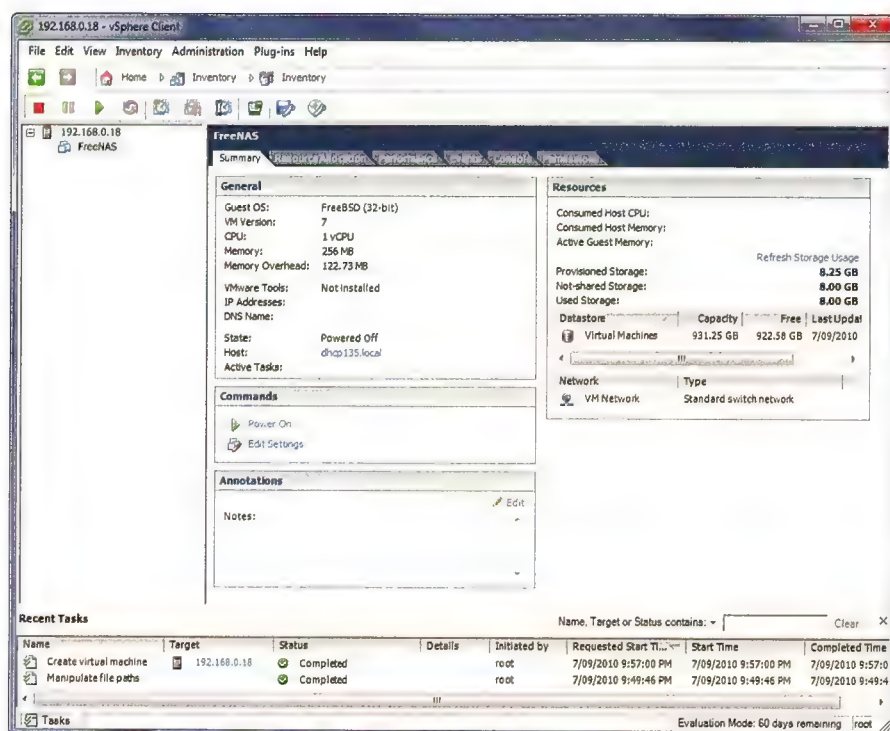


Figure 1: A VM for FreeNAS to call home...



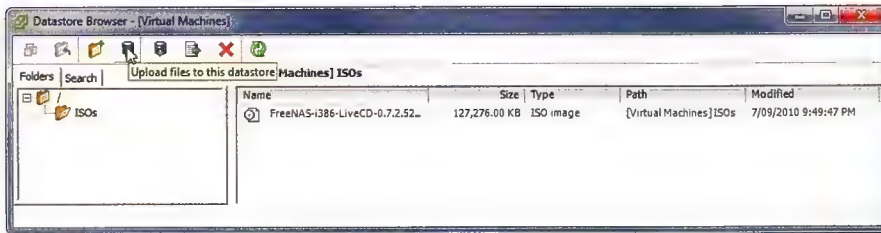


Figure 2: Upload the FreeNAS ISO into the datastore.

credentials during install, you will log in as 'admin' with a blank password.

Now, right click on your server's IP in the left column and choose to create a 'New Virtual Machine' from the context menu. A wizard will appear which will step you through the process. You will create a 'Typical VM,' give it a name (eg FreeNAS) and create it in your VM's datastore. Next it will prompt you for an idea of what the

in size. There's no need to burn this image to a physical CD, as we can mount and boot from the ISO directly. Once downloaded, right-click on the VM's datastore and choose 'Browse Datastore...' to view the files and folders inside. Open the ISO folder, as this where we want to store our FreeNAS CD image. At the top of the Datastore Browser you will see an icon that will allow you to upload the image file to the ISO

## The disk doesn't have to be huge... it's actually a large file in the VM folder in the datastore, kept in your primary OS...

guest OS will be. This is not essential to get correct; however it allows the wizard to default to some useful settings. In this case you will want to select Other and choose 'FreeBSD (32 bit)' from the list below, as FreeNAS is based on FreeBSD. Finally it will prompt you to create a new virtual disk. The disk doesn't have to be huge – the default 8GB should be fine to start with. The virtual disk is actually a large file in the VM folder in the datastore, kept in your primary OS. If you later decide you need more space, just add another 'disk' to the machine.

Once the wizard finishes you will see your virtual machine appear in the list in vSphere; see Figure 1.

You can click on it and see the tabs at the top of the window change to those relevant to the FreeNAS VM. In particular note the Console tab, as this shows you the actual console of the machine, exactly the same as if you were sitting in front of the (virtual) machine.

Next download the FreeNAS i386 LiveCD ISO image from <http://sourceforge.net/projects/freenas/files/>, which should be around 130MB

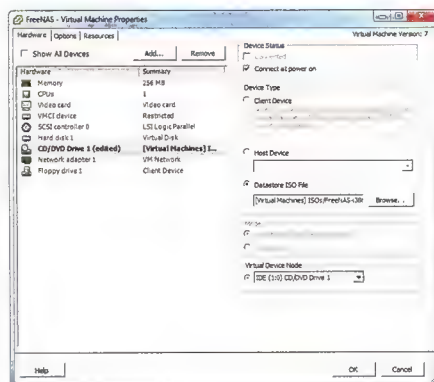


Figure 3: Prepare to boot from the FreeNAS ISO image.

folder, as in Figure 2.

Next, you need to mount the ISO as a virtual CD and connect it to your FreeNAS VM. Right click on your FreeNAS VM and choose 'Edit Settings' to see the VM's components. Select 'virtual CD' and you will see the options available to mount a CD in the VM. You can choose to use a physical CD drive on the ESXi host, a physical CD drive mounted on your machine running vSphere, or mount an ISO image of the CD. In this case we will use the FreeNAS ISO image in our VMs datastore, as per Figure 3. Ensure that

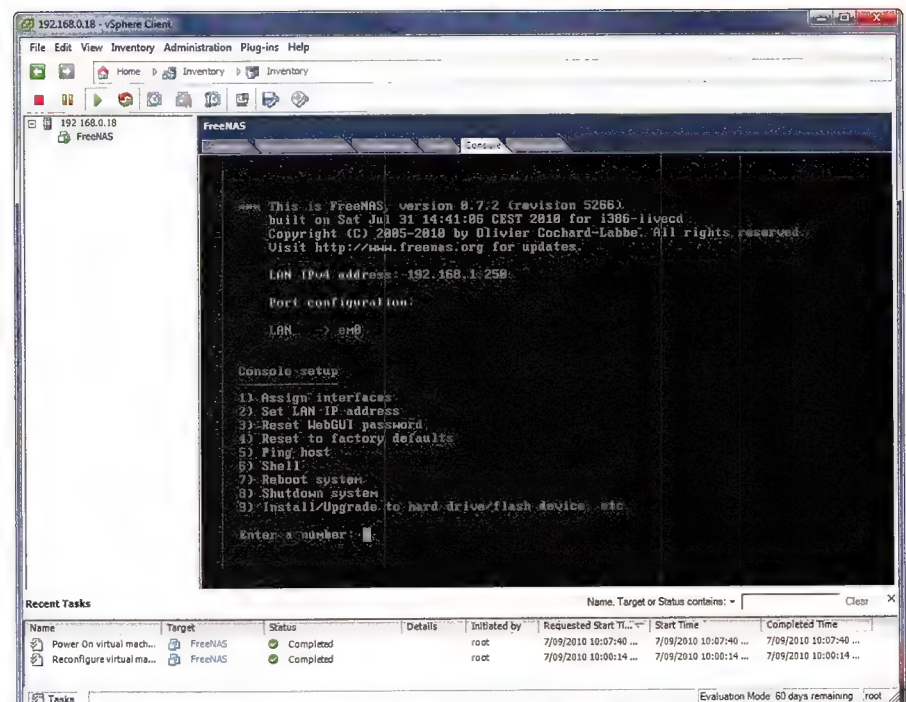


Figure 4: The FreeNAS console window.





# RIPJAWS

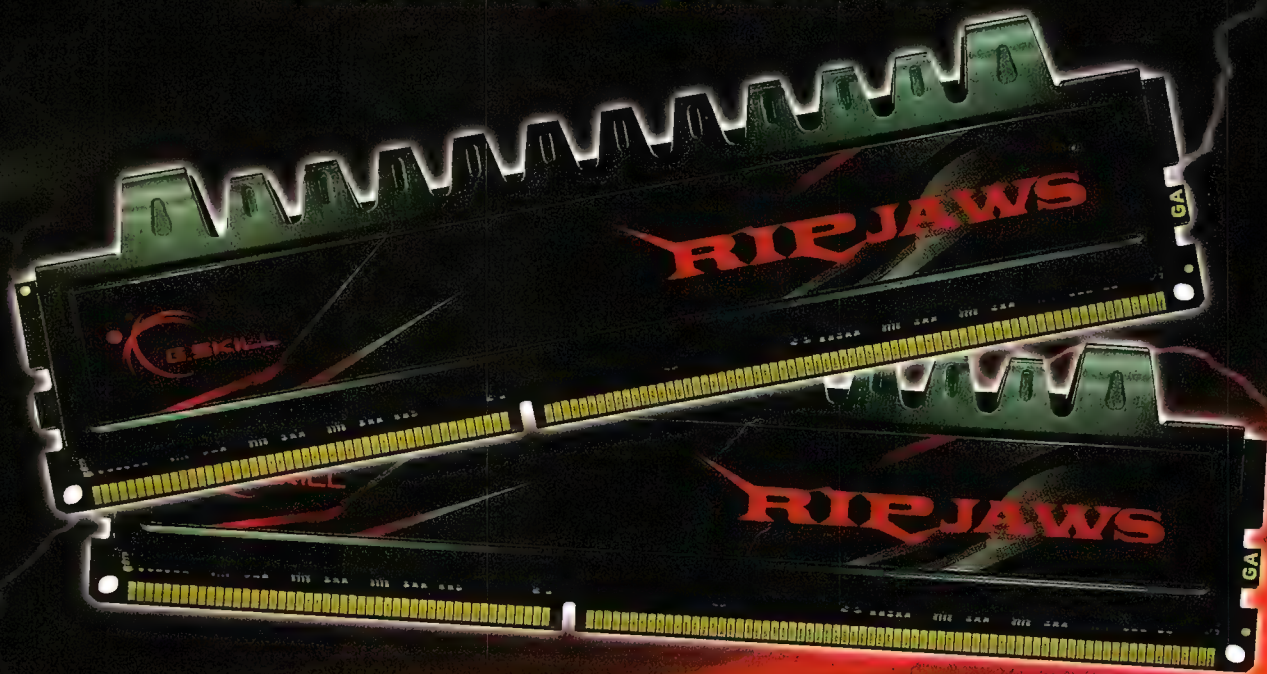
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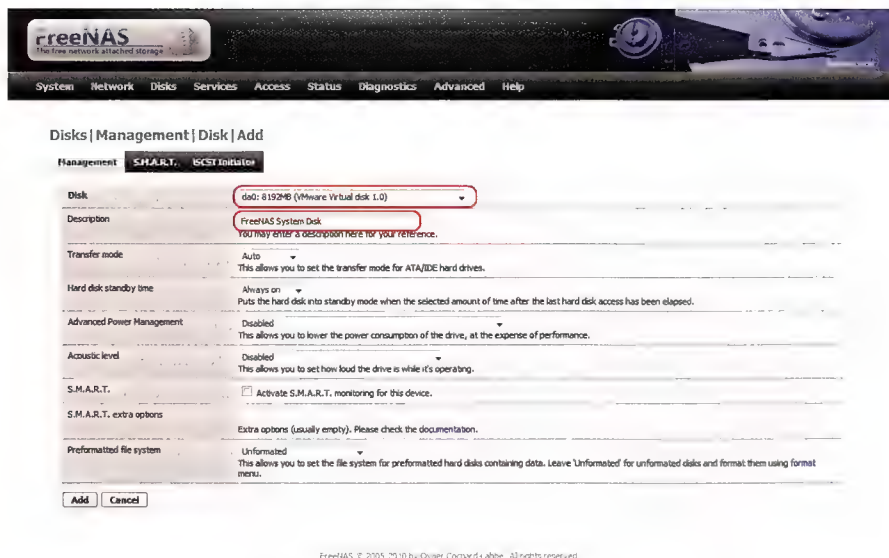


Figure 5: Adding a disk to FreeNAS.

the checkbox at the top is checked otherwise ESXi won't connect the 'CD' at boot time.

We're now set to start our VM and boot FreeNAS! Click the Console tab at the top of vSphere to switch to the virtual console of your machine, and click the triangular green 'Play' icon...

Click the Console tab at the top of vSphere to switch to the virtual console of your machine and click the triangular green 'Play' icon...

icon at top of screen. This will start the VM, and you will see it boot in the console window. Click anywhere in the black window to interact with the console. (Note that if you want to exit the console press Ctrl+Alt to release the cursor.)

FreeNAS is designed to be installed on a host drive, or even just run directly from a CD or USB stick. In a virtual environment it makes sense to install it on the virtual disk. You will have several install options available to you, all discussed in forums linked from the FreeNAS homepage. For this example we'll choose 'Option 2', to install the embedded version with a data partition. The installer will give you some information about what it will do, and then prompt you for where to install it from, and to. Just say 'Okay'. It will also prompt you as to whether it should create a swap partition. This shouldn't be necessary.

When complete you can right click on the VM and 'Edit Settings' to uncheck the Connected checkboxes at the top of the CD settings screen. Once you're done, you should reboot the machine (select '7 Reboot system' in the console) and once booted you should see something similar to Figure 4.

Finally, choose 'option 2' to set a static IP for FreeNAS so it doesn't wander off and get lost, and you're all done!

## Configuring FreeNAS

Once installed FreeNAS will display its IP on the console, so point your favourite web browser at it. The default username is 'admin', with password 'freenas'.

## RDM anything!

Expansion cards (PCI-E/PCI) of any kind are potentially mappable, as are all the built-in devices on the motherboard. The feature you're looking for is 'Virtualisation Technologies Direct I/O'. This was previously only found in expensive server boards, but now some desktop mobos also support it. Note that both the motherboard and the CPU must support this feature for VT-d magic to occur. Also be careful that you don't map out a device that the server depends on to run, or you'll be reinstalling ESXi!

VT-d aside however, hard disks are one device type that does not require this feature, and so can be mapped even on the most basic system!

The first configuration task is to 'introduce' the system disk to FreeNAS, as we will also be storing our data on this disk. Select Disks, and Management. Click the large '+' sign to add a disk, and you should see a page similar to Figure 5. Fill out the form and click Add. Once you return to the Disks | Management page you will notice an 'Apply Changes' button to click and 'lock in' the changes.

Next we want to mount the data partition (partition 2) for use as our FreeNAS storage. Select Disks, and 'Mount Point'. A similar screen to the Disks one appears. Click the large + sign

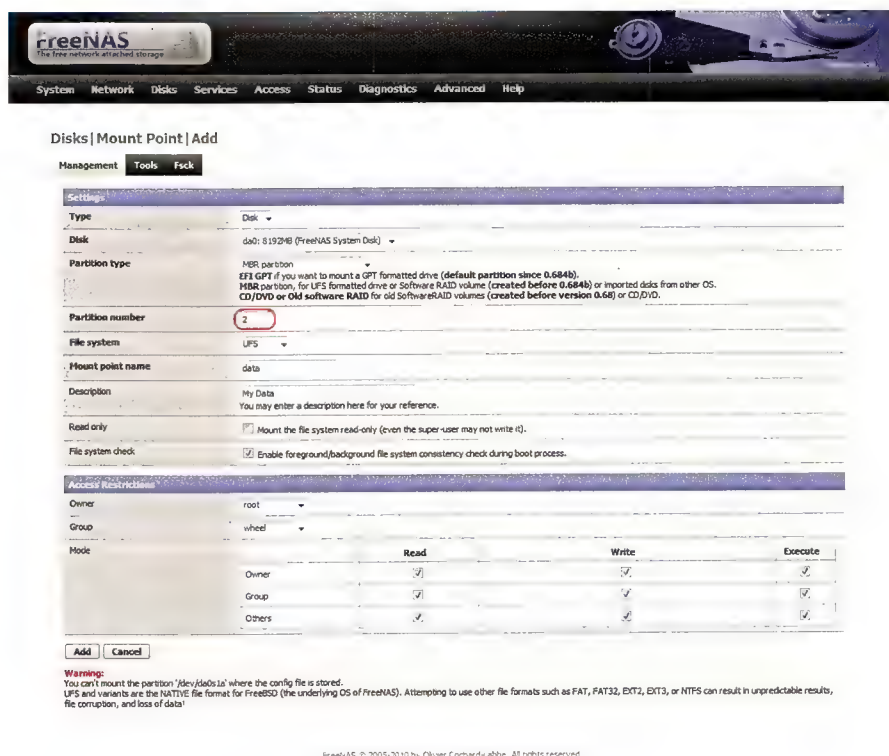


Figure 6: Mount a FreeNAS data partition.



FreeNAS  
The free network attached storage

System Network Disks Services Access Status Diagnostics Advanced Help

Services | CIFS/SMB | Share | Add

Settings Shares

Name: Data

Comment: My Data

Path: /mnt/data/

Read only: ☐ Set read only. If this parameter is set, then users may not create or modify files in the share.

Browsable: ☒ Set browsable. This controls whether this share is seen in the list of available shares in a net view and in the browse list.

Inherit permissions: ☒ Enable permission inheritance. The permissions on new files and directories are normally governed by create mask and directory mask but the inherit permissions parameter overrides this. This can be particularly useful on systems with many users to allow a single share to be used flexibly by each user.

Recycle bin: ☐ Enable recycle bin. This will create a recycle bin on the share.

Hide dot files: ☒ The parameter controls whether files starting with a dot appear as hidden files.

Hosts allow: This option is a comma, space, or tab delimited set of hosts which are permitted to access this share. You can specify the hosts by name or IP number. Leave this field empty to use default settings.

Hosts deny: This option is a comma, space, or tab delimited set of host which are NOT permitted to access this share. Where the lists conflict, the allow list takes precedence. In the event that it is necessary to deny all by default, use the keyword ALL (or the netmask 0.0.0.0/0) and then explicitly specify to the hosts allow parameter those hosts that should be permitted access. Leave this field empty to use default settings.

Auxiliary parameters: These parameters are added to [Share] section of smb.conf. Please check the documentation.

Add Cancel

FreeNAS © 2003-2010 by Olivier Cochard-Ladon. All rights reserved.

Figure 7: Adding a Windows (SMB) share.

to add a mount point.

Once again, fill in the web form similar to Figure 6 and click Add. Remember to click 'Apply Changes' once you return to the Mount Point screen.

Now we have defined our data partition we can share it out, using a variety of network services. To share our storage to Windows clients choose Services, then 'CIFS/SMB'. The Settings page is large, however a simple method is to check Enable at top right, and then click Save and Restart at the bottom of the page.

Finally, click the 'Shares' table at the top of this screen. Here you will define what you will share, in this case the data partition. Click the + sign to create a new share. You should see a page to add your share and fill it in similar to Figure 7. Then click Add, and of course 'Apply Changes' on the subsequent page.

Congratulations: you should now be able to browse your Network Neighbourhood and see your machine named FreeBSD, offering a share named Data, all available anonymously!

## Autostart

You may wish to ensure your FreeNAS VM starts automatically when ESXi boots. Simply highlight your server/s in the list on the left of vSphere and click the Configuration tab at the top of the screen. You can then select Automatic startup/shutdown in the software section and follow the onscreen instructions to move FreeNAS into the Autostart section.

You may now wish to browse the FreeNAS web interface to learn how to create users and apply permissions to your data share. Remember, if you run out of space you can always 'Edit Settings' of your FreeNAS VM and add another virtual disk to share.

## Time to Get Serious: Raw Device Mapping

Note that the default shared storage location is on the same virtual hard disk. Remember that a virtual disk is actually a large file that is seen as a hard disk. Every read/write is intercepted and virtualised into an operation on this file. As such, while this process is fine for your XP machine's system disk, it will not be very fast for a NAS. So, how do we make it faster?

The answer lies in Raw Device Mapping (RDM). RDM is the process of 'mapping' (or dedicating) a complete device to a particular VM, and no other VM has access to it. In some ways this goes against the overall virtualisation strategy, which decouples the concept of software running on dedicated hardware. However if you need raw performance and are not concerned with portability (and we're really not) this can be useful.

The process of creating an RDM disk is not supported in the ESXi GUI (as it is a feature reserved for the expensive ESX version); however you can manually create one using the command prompt, also known as Remote Tech Support (SSH). If SSH is not enabled, you will have to refer to my first ESXi article for how to enable it from the console. Once enabled you can use an SSH terminal program to get a

## USB Mapping

Perhaps the most useful of all physical devices to map into a VM is a USB device. This device type is similar to hard disks in that VT-d is NOT needed to get your USB device recognised, however note that this feature is only available in ESXi 4.1 and above.

To map a USB device you have to perform these basic steps:

1. Physically connect the USB device to a USB port on your ESXi host.
2. Edit the settings of the target VM and add a virtual USB Controller.
3. Re-edit the settings of the target machine and add the USB device. USB devices currently detected by ESXi will be available in a list to select.

Further details are available at [http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=1022290](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1022290)

command-line interface to your ESXi host. The most common SSH program is PuTTY, which is freely available on the net. Be very careful when using the SSH interface, as you can easily trash your ESXi host beyond repair by slashing the 'Big Sword' around recklessly! Details on how to RDM disks can be found at [http://www.vm-help.com/esx40i/SATA\\_RDMs.php](http://www.vm-help.com/esx40i/SATA_RDMs.php). Follow these steps carefully!

Once you have created your RDM disk you add it to your FreeNAS by shutting it down, and adding it to the VM's configuration. Right click on the FreeNAS machine and click 'Edit Settings'. Then select a Hard Disk and click the Next button, as in Figure 8. Choose to add an 'existing disk', navigate to your RDM file, and it should appear in your virtual hardware list.

FreeNAS will now start and see this hard disk natively for full performance. You can format and share it via the FreeNAS web interface. On our test rig we've shared the free space on the FreeNAS system disk, and an RDM disk. A basic windows copy test produced the following speeds for the rig:

| Disk                 | Read Rate (MB/s) | Write Rate (MB/s) |
|----------------------|------------------|-------------------|
| System(Virtual disk) | 51               | 50                |
| RDM(native)          | 53               | 60                |

This indicates that FreeNAS is quite fast using either virtual or RDM disks in this case. You may find more of an RDM performance increase on an older machine due to CPU usage during virtualisation of disk operations. Either way this is more than fast enough to stream to your media centre in standard, or even high definition!

## Where to Next?

Why not add another RDM disk to FreeNAS and mirror them to form a cheap, performance NAS



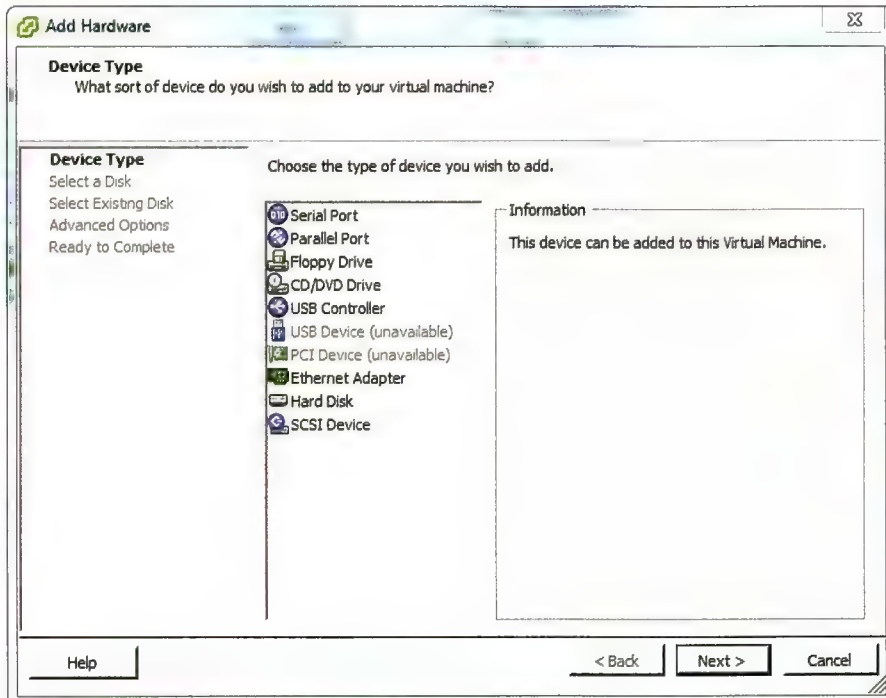


Figure 8: Adding a RDM disk to the FreeNAS VM.

you can trust? Create a share for your backups and point Windows 7's built-in backup tool at it to keep an automatic backup of your rigs.

If you're about to try some dodgy software from the Internet you'll want to explore the Snapshots feature. Simply snapshot the running VM before you begin and you can revert to, or delete, the snapshot when you're finished. You

There are many things to explore, now you have an ESXi host to experiment with!

We're happily sitting here making the final touches to this article in a virtual XP machine on the left monitor, while watching a movie in a virtual Windows 7 machine on the right. The movie is streaming beautifully from a virtual FreeBSD server, and Word is responsive. The

## Simply snapshot the running VM before you begin and you can revert to, or delete, the snapshot when you're finished.

can roll back to any snapshot you've created in the past, or consolidate them if your experiment works out well.

How about a 'burn' machine that, once installed, reverts to the newly installed state every time you reboot? Simply shut down the VM and mark its disks as nonpersistent. Now, every time you trash the machine just hit the virtual reset button!

### VM Appliances

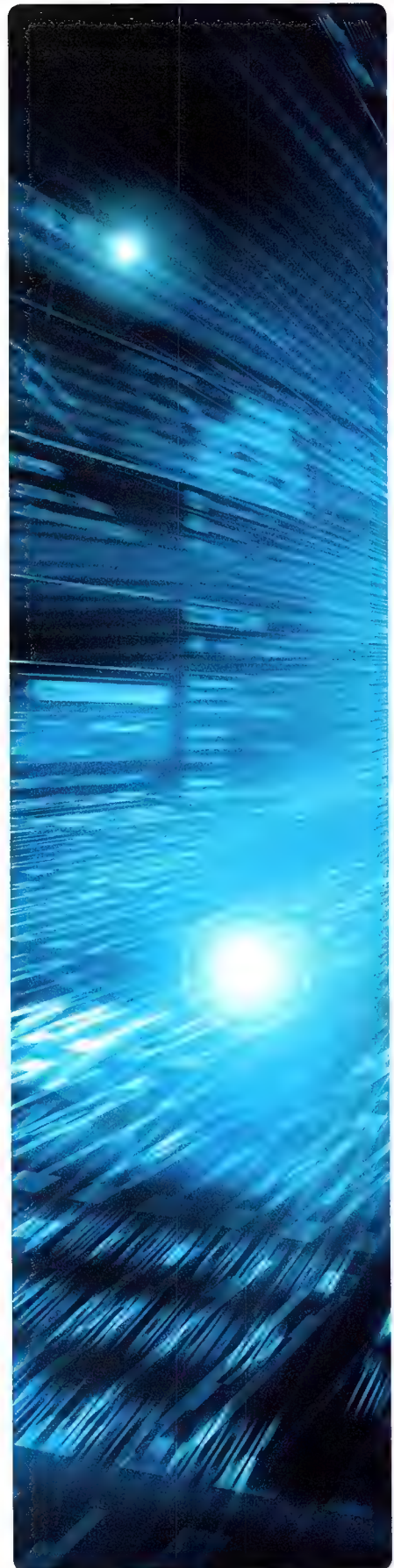
Check out the many pre built VM's available to simply download and run. These are called Appliances, and there are thousands to choose from at <http://www.VMware.com/appliances/>. Want to try out Ubuntu, or CentOS? Need a quick network monitoring tool? Try Nagios. How about a quick Squid proxy, or a firewall? It's virtually effortless!

Gig switch under the desktop is going ballistic and keeping my feet toasty in the process. All is good; this is normal.

However, I must offer a final word of warning to the uninitiated – there can be a nefarious dark side to this tech.

Take my mate, for example. A couple years ago he scrounged an old Dell desktop and created his own Virtual Happy Place. He's now spent up big on a shiny new HP server to house his essentials. 'Essentials' include four FreeBSD VMs, several Win XP, several Win 7 VMs and a couple virtual Windows Server 2008 VMs for his Active Directory. He has a high-end RAID card mapped into one of his six Solaris VMs to provide a lightning fast NAS using an external hotswap case for his RAID disks. He now justifies this upgrade as giving him enough headroom to run up Exchange 2010...

This, people, is not normal. I think he needs help managing his ESXi addiction. And of course... you have been warned. ☹





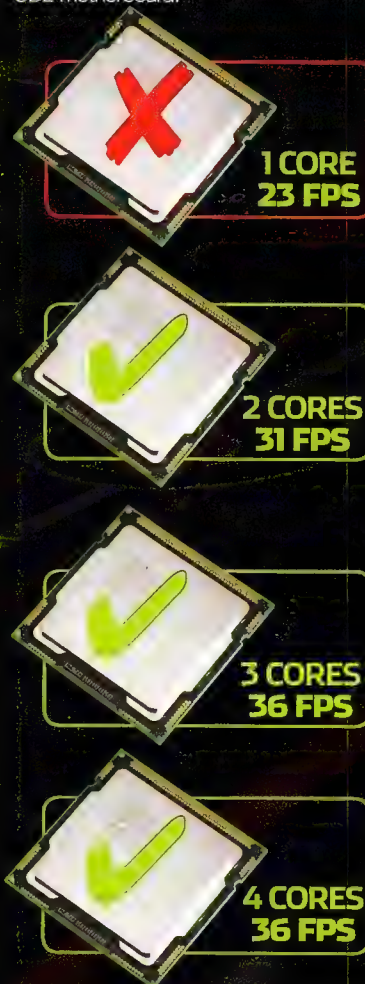
# TWEAK F1 2010 TO RUN ON ANY SYSTEM

With the 2010 F1 championship proving to be one of the best in recent memory, we look at getting the most out of the game that places you in the middle of the action.

Given that F1 2010 has been developed with one eye on the console market, we weren't surprised to find that it's a relatively undemanding game to run. Don't let this put you off though – at its visual best, the game looks stunning, especially when you're forcing Alonso into the barrier at 175mph. As a result of its undemanding nature, we explore how those of you with mid-range or last-generation hardware are likely to fare with the game.

## The CPU Factor

Games are slowly becoming more efficient at using the extra cores of modern CPUs, but with the latest Steam survey results revealing that 72.57 per cent of gamers still run single- or dual-core processors, clearly not everyone is in a position to benefit. We disabled some of the cores of a Core i5-760 CPU to find out how much of a performance hit those of you with older CPUs are likely to see. We used a GeForce GTX 480 graphics card, 4GB of DDR3 memory and a Gigabyte GA-P55M-UD2 motherboard.





## THE GPU GRID

A top-end, current-generation card will blitz F1 2010, but how do mid-range and previous-generation cards cope?

We tested a number of previous- and current-generation graphics cards to assess what type of performance you can expect when playing F1 2010. If you're gaming at 1,680 x 1,050, you should be able to run the game at its highest settings without much fuss. It becomes a little tougher when you try to step up to 1,920 x 1,200, though, so read on to find out whether you'll need an upgrade to get the best out of the game. Our test rig used a Gigabyte GA-P55M-UD2 motherboard, 4GB of DDR3 memory and an Intel i5-760 CPU.

### NVIDIA GEFORCE GTX 460 768MB

#### Mid-range, current-generation

Our pole sitter is the mighty mid-range powerhouse, the GTX 460 768MB. Frame rates never dropped below 30fps even at 2,560 x 1,600, with one of these strapped into our test system. Clearly, if you've recently upgraded to this baby, you have no excuse for missing a single apex. However, we noticed that the front wing of the GTX 460 flexed a surprising amount during testing.



We brought the GTX 280 out of retirement to assess what it was capable of achieving, and while it was dominant in its day, it now lags behind its younger competitors. A

minimum frame rate of 32fps at 1,920 x 1,200 hints at the speed this card used to be capable of, but a result of 24fps at 2,560 x 1,600 means that you'll need to drop some quality settings to game on a 30in monitor. Maybe it should never have come out of retirement?

### NVIDIA GEFORCE GTX 260 986MB (REV 2)

#### Upper mid-range, previous generation

The GTX 260 (rev 2) was a firm favourite with gamers a couple of seasons ago, but its aging architecture means

that it isn't able to deliver high speeds reliably anymore. Gaming at 1,920 x 1,200 was just within reach of the card, but realistically, it's given up hope of ever seeing the podium again.



### ATI RADEON HD 5770 512MB

#### Lower mid-range, current generation

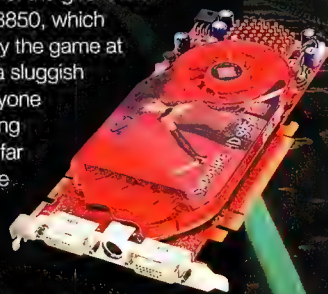
P2 belongs to the capable but budget HD 5770, which secured second place on the grid with a minimum frame rate of 36 fps at 1,920 x 1,200 and 27fps at 2,560 x 1,600. This isn't a bad result for a card that hasn't received a new aero package since its release. We suspect ATI is putting its resources towards next year's model instead.



### ATI RADEON HD 3850 256MB

#### Mid-range, two generations old

Bringing up the rear of the grid is the underpowered HD 3850, which was only able to play the game at 1,680 x 1,050 with a sluggish 27fps minimum. Anyone viewing the starting lights from this far back should be considering an upgrade soon. Still, at least its fuel tank was big enough to enable it to make it to the end of the race.



### NVIDIA GEFORCE GTX 280 1GB

#### High-end, previous generation





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# GAMEPLAY

GAMES, GAMING AND GEEKERY COVERED... ATOMIC-STYLE

**W**e'd like to say that now that the Christmas rush is starting to ebb, things have quietened down here at Atomic HQ, because we really, really need a holiday. But it's not been the case. This month saw fewer games land on our desks, but all that means is that we've been able to give more attention to the ones we did receive.

Which is lucky, because among them was a small, little-known game called Call of Duty: Black

Ops. Read our review on page 88 and check out shots from the awesome Black Ops LAN night we put on for some of our luckier readers on page 94. A great time (and a lot of beer) was had by all!

Also this month: Ben Mansill gets up close and personal with the new Operation Flashpoint release, spend some time with Shogun II, don a chicken suit in Fabel III and much, much more!

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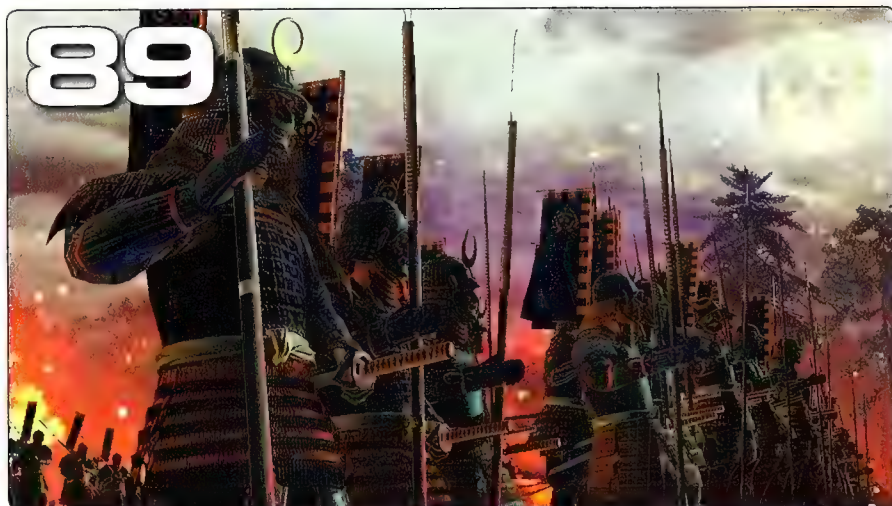


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# Operation Flashpoint: Red River

The second Operation Flashpoint game from Codemasters shows a war-like determination to defeat the past and storm the future. Ben Mansill has a chat with the developers.

**T**he lead-up to Operation Flashpoint: Dragon Rising's launch in October last year wasn't pretty. Fans of Bohemia Interactive's 2001 classic were wondering suspiciously and loudly about how true it would be to the sandbox freedom and hyper-accurate military setting we all associated with the words 'Operation' and 'Flashpoint'. Fuelled by the impact of Bohemia's just released Flashpoint-by-another-name Arma 2, which was widely praised as being what it's all about for military sims, a farboy war heated up that eventually dragged in reps from Codemasters and Bohemia in an ongoing napalm exchange of bitterness. As far as bad publicity goes, it was excellent for Codemasters with many more potential players curious to see what they came up with.

As it turned out, Operation Flashpoint was a polished and enjoyable game. Sure, it wasn't as expansive as Arma 2, and yes, it was heavily scripted. But it did its own thing, staked new ground in a busy niche and was a great game – one which Codemasters could be proud of.

Sandwiched neatly between the openness

of Arma, and the super-scripted velocity of CoD and MoH, the new OFP franchise is shaping up as an appealing pastime for gamers who like neither, or in fact, both. That balancing act is high in the minds of

Codemasters' Executive Producer Andy Parsons and Principle Games Designer Tim Browne, who with their team are tidying up the last bits of the first new game in the series, Operation Flashpoint: Red River.





## Pleasing mostly everyone

Much like the last game, the focus is on the experience, not the world. We spoke with Andy and Tim, covering a range of topics. On how the game will balance, Andy told us "Our aim is to bring in guys playing other first person shooters and who want a more authentic experience, without sacrificing game play. So it's important we ease them in without patronising them, having one button access to key functions and mechanics such as the finely balanced aim assists they're used to, but remove them once they feel comfortable with the different style of game play and want a more challenging game on the harder difficulty settings. In summary, it would be a fair to say we've maintained the DNA of Flashpoint but made the barrier to entry much,



**"... it would be a fair to say we've maintained the DNA of Flashpoint but made the barrier to entry much, much lower..."**

much lower for those that want something more than a corridor shooter on rails."

## Gun play

We do like a well-modelled pretend gun, and Operation Flashpoint: Dragon Rising nailed it well. Each weapon had a clear and intriguing behaviour. Players were always wanting to try out new weapons in different scenarios, which is a sure sign of a very good game.

I asked Andy how Red River would improve on that. "From the turn speed based on weight

to dispersion, time to reload, recoil and rumble, muzzle velocity, fire rate and muzzle flashes, everything is tweaked and played until we feel the 'behind the gun' experience is completely honed. This authenticity is then linked to game play so that it's very realistic, but not a mil-sim that just isn't fun. There's lots of, but the overall attention to detail in the environment, weapons and vehicles as well as the mission insertions places you more into a contemporary conflict than a traditional tunnel shooter does."

Ahh, so a 'contemporary conflict'. That's

fresh. To be fair of course, current affairs make this trend almost obligatory, though this whole 'paying tribute to our armed forces via letting kids shoot pretend people' we're seeing in the blockbuster games is too much. Red River keeps it real, aiming just to deliver the experience, with, hopefully, the player left to form their own impressions. In the new game you're a regular USMC grunt, able to run around as either a Grenadier, Scout, Rifleman or Automatic Rifleman. You're under the command of one Sgt Knox; who, without having played the game, we're certain is surely grizzled. That gameplay structure provides nice cohesion and we're just as sure, some clichéd war hero dialogue.

## Quite a large war

We also applaud Codemaster's grand theatre backdrop. Tajikistan is a real place, in a nasty







position; a teeny little country tucked up against China, Pakistan, Afghanistan and a couple of other lesser 'stans. And China's decided to invade. That's a bad day in any country's book, all compounded by opportunistic insurgents who jump into the fray, with you, the boys and cigar Sarge there to fix things up.

The scope and intensity of missions has immense potential. Tim tells us that "the player will experience what it's like to try and stave off an all-out assault from an advancing army. They'll get to experience moving as a convoy and trying to keep that convoy going, as well as defending it from attack if it does have to stop for any reason. The player will also get to clear entire towns of enemies while trying to hunt for friendly survivors."

We didn't do much actual foot-time in Operation Flashpoint: Dragon Rising. The game let players take control of an array of armoured vehicles, as well as the ultra-rare attack chopper, so of course that was what we did. In Red River, Tim tells us it's back to basics. "We've decided to focus on the infantry experience in Red River. As they say 'Marines don't fly choppers, pilots do'. It's all about the USMC and their day jobs. To that end, we've made it a much deeper experience, based on how they fight, how they interact with each other and so forth. What we do have is the mission insertions that take place in Humvees and Choppers, depicting the Marines entry in the AO together with Sgt Knox briefing you."

## You and your squaddies

We were curious about whether Red River wants you to feel like a solo hero, or closer in as part of a tight group. According to Andy, "We've definitely focussed our efforts on making the player feel part of a bigger campaign, and part of a 13 man squad. Playing as a solo hero in this game will get you and your squad mates killed, and that makes it very different to the other shooters out there."

"How we've done that is through many mechanics. For a start you have control of a single player of your fire team and can choose

**"Playing as a solo hero in this game will get you and your squad mates killed, and that makes it very different to the other shooters out there."**

their class and load-out from the beginning. You can direct them in-game to follow your orders through our new streamlined command radial; this way they tactically engage enemies and support you throughout each mission. In addition the new radar shows your other two squads, Alpha and Charlie, who you will need to support, otherwise the whole mission will become FUBAR; without your support they'll die and fail. All this is under the constant instruction of the squad leader, Knox, who directs you through the objectives of the mission and educates you on the ten rules to success in Tajikistan. This gives you the feeling that others are relying on you, and that you're part of a much larger picture."

## How real?

The feeling that you're a small player in a massive scene – but one able to make a difference – is looking like being something of a trademark OFP

flavour. Set against a backdrop of the frightening reality of war, Red River pleasingly minimises the patriotic rah-de-rah that CoD and MoH bang on about. Andy has a clear idea about just where the franchise sits.

"We're not glorifying war or leveraging current events. We're bringing greater authenticity to Red River by focussing our efforts on the USMC infantry experience, so this is done in a lot of ways. There's the way the marines look, speak and customise their weapons, together with guidance from their squad leader using Knox's ten rules."

Sounds good, Andy. So how else will Red River immerse us in the battleground? "There's lots more, but the overall attention to detail in the environment, weapons and vehicles as well as the mission insertions places you more into a contemporary conflict than a traditional tunnel

shooter does."

"What we haven't changed is the tension and unforgiving nature of modern conflict. War is deadly, and you won't be able to take six bullets and run off and take cover while your body 'heals' itself. We have made it more accessible, with one button healing for example, and also to see the danger before it occurs, and give you the tools to survive and succeed."

## This is my weapon, this is my gun

Survival tools? That's gun talk! So what sort of kit can we play with, then? I asked Tim about some of the more interesting weapons and devices a player can use in the game.

"The FGM-148 Javelin Anti tank system is making a return from Dragon Rising. This weapon is a fantastically smart weapon that





deliberately sends its guided warhead up into the air so that it can perform a 'top attack' on a tank's turret, which is where a tank is weakest."

"Some more conventional firearms new to Red River are the M1014 tactical shotgun – perfect for tight CQB areas – and the DMR (designated marksman rifle) and EMR (enhanced marksman rifle), which give the players a fantastic long range capability. We're also giving the enemies new weapons to play with such as the AK-47, Type 2004 RPG for the insurgents, and the QBZ03, which is a new battle rifle that the PLA will be using against you."

## Interface refinement

With the scenario looking rich and the tools appealing, having a good control interface becomes essential, and Codies almost got it right last time with a pop-up rotary controller for issuing orders and choosing your toys. 'Almost', because it wasn't ever quite as smooth, fast or natural to use as it could have been. Some work has gone into slickerfying the interface for Red River, as Andy told us.

"Part of removing the barriers to entry for Red River was to streamline the whole control system, now using single button presses to swap weapons and heal as well as using familiar mapping for sprint and stance. As part of this strategy we've streamlined the command radial, so that less is more!"

"Commanding your team as quickly as possible was our primary goal, so we've removed a tier on the radial. When invoked on screen you can clearly see all your choices at once, and see what nested commands are available. It's much quicker to react and it has 'back' functionality to avoid having to invoke it again. As it's context sensitive we've added



context commands to the first level to aid the player rather than add more nested commands that take too long to find when you're under fire. So for example, rather than have a command to 'fall back', you simply point in the opposite direction to the main engagement and select 'move' from the radial; the squad will fall back, and cover and suppress while doing so. This makes the whole radial more efficient and easier to use."

## Pushing the graphics

The EGO engine – Codemaster's bedrock 3D engine – has seen a lot of evolution. It is a refined, good looking and fast performer, most recently used for F1 2010 to great effect. For Red River and its promised busy and big world, Tim tells us that "The EGO engine is excellent at coping with large draw distances while

filling the world with highly detailed characters, weapons and vehicles. This allows us to create a realistic feeling world and authentic battles and confrontations between the players and the AI. Because the game now focuses on both close quarters battles and medium to long distance engagements, the EGO engine has been adjusted to give us high density villages and towns, which helps create tense atmospheric conditions for the player to experience."

You can expect more from the Operation Flashpoint franchise in years to come; it'll be a regular in the shooter scene and a key part of Codemasters' portfolio. For now we're looking forward to playing Red River, grateful that Codemasters has stuck to a workable formula that's got the big vision, and teamed it with technical refinement that should add up to being a good play. 🎮







Fast, frenetic and gritty, this might just be the best COD release yet ... but is it too much?

**T**he latest Call of Duty release has already broken entertainment sales records, and by the time you read this it's likely gained sentence, started a hard take-off singularity and taken control of all world markets and mediums. So, really, we could fill this page with pictures of kittens and random bits of our porn collections and it would be just impactful on the success of the mighty CoD juggernaut.

But humour us – because we do have a strong opinion on this game, and – we hope – one that might prove useful.

Anyway, if you've been living in cave or just come out of a coma, Black Ops is seventh game in the Call of Duty series. A series, coincidentally, that we're expecting will become increasingly oddly numbered and referenced when the inevitable Black Ops 2 comes out. It eschews not only the World War 2 settings of the original games, but also the hyper-realised near-future setting of the Modern Warfare games. Instead, Black Ops explores the secret history of the 20th century, as seen through the eyes of black ops specialist Alex Mason.

## Bright and shining lies

Black Ops presents a far grittier world than any Call of Duty game before it, and you start off in a typically grim style... strapped to a chair in an interrogation room and getting tortured by faceless minions.

It's fun times all round, really, and it makes for a great framing reference for the early missions in the game, which play out, effectively, as flashbacks. The first mission in particular is a

great set piece that establishes the shadowy world Mason inhabits quite well – you're part of a secret mission to assassinate Fidel Castro during the Bay of Pigs invasion in the early sixties. It's a great nod of the head to a turbulent period of history, and this first mission sets up the game's great themes – identity, the Cold War, and unveiling the real history behind some of the turning points of last century.

In many ways it's annoying that, in the grand scheme of things, this is the part of the game will likely be most quickly forgotten. Most people will treat it as little more than a training regime for the game's main event – the online play. But the campaign manages to reference



historical events and classic conspiracies of the period, culminating in one of the most infamous assassinations in history.

And you might just be the trigger man... It delivers a slightly different take on the







increasingly well-worn military shooter genre. But it's not perfect, not by a long stretch. There are many frustrating portions of the game that could really use a lot more explanation, and a heavy reliance on scripted events. On harder levels, where death happens often, you'll certainly get sick of the same enemies spawning in the same order as your own allies do the same things.

But, overall, it's probably the strongest story in the franchise yet.

## Napalm for fun and profit

There's a handy little ticker on the multiplayer launch GUI for Black Ops that keeps you up to date on the insanely huge numbers the game is racking up. It reports silly things like miles

sprinted, or tonnes of explosive detonated... and it's staggering. Similarly staggering is just how fast some folks are burning through the levels for virtual soldiers – do these people not have lives?!?

Well... probably not. What they have is a serious dedication to one of the most frenetic online experiences you'll ever enjoy – or not enjoy, as the case may be. Treyarch – Black Ops' developer, and one that's drawn much criticism in the past for being the red-headed step-child of the Activision stable – has delivered a fiendishly rich experience, easily banishing any worries about its involvement.

If you're a CoD veteran, you'll know the basic structure and game modes on offer. In this respect, Black Ops' multiplayer is more evolution than revolution, and that kind of extends to



weapon modelling and the array of perks and killstreaks available. But what's quite new, and quite annoyingly addictive, is the addition of CoD Points as a form of combined XP and currency, allowing you to purchase new weapons, upgrades, perks and even cosmetic items like facepaint and custom cross-hair options.

Even more impressively, these points can







be wagered in the appropriately named Wager mode, where you bet your points on the outcome. It's a lot of fun, though you really need to be on top of your game – which, if you have that many points to play with... you more than likely are.

In general Black Ops multiplayer manages to be faster, more hectic, and somehow grittier than its predecessors. At times, it's almost too fast; combined with maps that lean more towards chaotic meeting engagements rather than steady lines of battle, this can lead to a frenetic experience that's not altogether pleasant. Too, the weapon handling seems very loose; it's certainly no match for the superlative modelling and ballistics in the original Modern Warfare. When it all works, though, you get a game like no other, with the ability to wring every last drop of adrenaline from you and truly punish your keyboard and mouse.

This is all assuming you're not being held up by any of the game's many bugs.

We're not going to beat around the bush – at launch Black Ops on PC was a dog. It could barely handle multi-core CPUs, had enormous lag and stutter issues, and was, basically, a game best avoided. A large patch has fixed

a lot of that already, thankfully, but there's still some niggling issues that make us wonder if the netcode behind the game is as solid as it seems. For instance, there's often a huge difference between in-game kills and the replay in the kill-cam. Similarly, we've more than once been shot by someone who doesn't seem to even be looking in our direction.

There's also a lot of fluctuation in reported lag, and for anyone outside of Sydney and Adelaide – where the game's server infrastructure is hosted – we imagine that's going to be even worse. But at least we do get dedicated servers, and while we don't have a proper LAN setup, the Private Match system is a pretty good stand-in (as anyone who showed up for our Black Ops LAN at HQ can report).

## Too old?

Black Ops is, ultimately, a mega-title that's quite beyond any criticism we may launch at it, but one thing that does come to mind is the feature we printed recently, Giving Up The Gun (issue 118). It was about why older gamers – guilty as charged – give up the hobby, and after playing Black Ops we're really feeling that disconnect. We played more hours than is likely healthy of

Modern Warfare and even its sequel, but Black Ops does seem, at times, too fast, too loud, and way too over the top.

In one of our bouts on the game's smallest map, Nuketown, one skilled player racked up enough kills to call in a gunship – which simply dominated the tiny map. It was a brutal cycle of spawn, die, spawn again, die again... and it was just not fun. Similarly, the number of players who've already worked out the optimum points for long-range, speculative grenade attacks is staggering – and, again, frustrating.

Then there's a mess of other things that just seem overwrought – the gravelly voice intros and cues on every map, the stupidity of weapons like the ballistic knife, and the WTF ability to replace your cross-hair with a love heart... it leads us to question if we're so far beyond the target market as to render our opinion effectively moot.

And, looking at the sales, and that impressive little stats tracker, it's likely we are. We're probably going to keep playing Black Ops, but it feels more of a reflex reaction than for any compelling reason within the game itself.

Growing up is a terrible thing. **DH**



PC, PS3, Xbox 360 (reviewed on PC)

Developer Treyarch  
Publisher Activision  
Website [www.callofduty.com](http://www.callofduty.com)

### Gameplay

Fast, explosive, and over the top, but at times buggy.

70

### Graphics

Some great smoke and particle effects.

82

### Sound

Enough with the hardbitten commentaries!

75

### Overall

Tailor-made for ADD sufferers and those who love grenade spam.

74%





# Shogun 2: Total War

The classic strategy game returns to its Bushido roots - but is looking back a healthy thing?

**W**e're still addicted to kicking Napoleon's Sicilian arse in the Total War of the same name, and no other Total War is already slated for March next year? It had better be good...

And, thankfully, from our hands-on with the appropriately epic Shogun 2, we're thinking it's going to be better than good.

It's going to be great.

## Back to the start

Shogunate era Japan is where the Total War franchise started, way back in June of 2000 – ten years ago, and just typing it makes us feel old. In an era of classic resource/rushing RTS, it was a breath of fresh, historical air. With a detailed campaign mode that dictating the ebb and flow of the tactical battles, this was warfare like we'd never seen it before.

It was also a very clever period for The Creative Assembly to kick off their series – 16th century Japan is not exactly a by-word in gaming, not even amongst warnerds like ourselves. That said, it was rich with easily recognisable imagery – the stoic samurai, the sneaky ninja, and those atmospheric pagoda-shaped castles. It allowed Creative Assembly to wet its feet with a period that was not going to be picked over by nerds and wargamers, before moving on to more well known periods: Rome, the medieval age, and the modern efforts and blackpowder warfare.

However, the grognards at Creative Assembly (can we shorten that to CreateAss? No?) have always felt a huge love for the politically complex and militarily fascinating medieval Japan.

In fact, with Empire and Napoleon under their

collective belts, they felt it was time to go back to their first love.

This Shogun 2, a true labour of love from arguably (well, if we're doing the arguing, anyway) the best strategy franchise on the planet.

## Ganbatte!

On the surface, this is much the same game as its predecessor – same period, similar factions, more or less identical overall goal. But delve only a little deeper and you'll see what is arguably the richest Total War experience yet, unified top to bottom by a beautiful artistic style all drawn from period inspirations.

There are all the usual options – single historical or what-if battles, tutorials to bring you up to speed on the game's new features and of course the awesomeness that is the Grand



Campaign, or smaller, more manageable ones. However, our build of the game was a touch limited – we are amongst the first in the world to get hands on time with Shogun 2, after all.

So, sadly, no Grand Campaign – our usual first stop in any Total War game – for us. Instead, we got to play with a couple of single battles and the Campaign tutorial, which features all the





## Mark O'Connell Q&A

**atomic** It's reported that the game's engine will be able to support 56,000 soldiers on the battlefield which is starting to be a true 1-to-1 ratio to the historical period. Can you hint at what kind of hardware's going to be required for that level of detail?

**MO:** Higher-end machines will indeed be able to run with this many troops. The game will usually adjust the amount of troops based on your systems capabilities, and you can still get the full Shogun 2 gameplay experience on a lower spec PC with smaller numbers of men. We are aiming to keep the specs close to those of Napoleon: Total War. Our team have done a fantastic job optimising the engine to look better than ever at little additional hardware cost.

**atomic** Can you tell us more about the family politics side of the game?

**MO:** Certainly. Family politics played a huge role in the Sengoku Jidai period. This was a time of social and political change, not to mention the near-constant warfare and chicanery between clans and rival families. We wanted to capture as much of that as we could and put it in the game, so as well as managing your family tree and protecting your heirs, you'll also be able to interact with family members from other clans, marrying them into yours to strengthen your relationship – so family becomes an integral part of diplomacy, much as it was in 16th century Japan.

**atomic** How much impact will special units, like the hero units that have been mentioned, have on the campaign?

**MO:** You can think of hero units as the best of the best. They're at the top of the chain – the best samurai unit, the best bow unit. They represent the nadir of your investment in the martial arts and buildings and are therefore fairly powerful. But at the same time, they're not going to win you battles single-handedly. They are merely the best at what they do. Use them well and you'll potentially help turn the tide of the battle – but don't expect to blindly throw them in to a battle and come away with a huge win.

**atomic** What kind of multiplayer options are going to be available?

**MO:** While our multiplayer features are still under wraps for the time being, I can tell you that we have spent a great deal of time in improving this aspect for Shogun 2. You can of course expect features from previous games to return, in addition to some exciting new additions. We are hoping that this is the game that lures traditionally single player campaigners to give online a try. We have big things planned for multiplayer, so watch this space!

**atomic** What will the final turn structure be like, and is there a set turn length or end point for the campaign?

**MO:** We're still balancing things here, but I can give you a rough rundown as to how the turn structure will work. You'll start around the middle of the 16th century. Each turn will be represented by a season in the game – so there are four turns in a year. It fits the time period nicely. Seasons play a huge part in Japanese culture and warfare, and always have, so basing the turns around them made sense. Expect each season to play differently, too!







most important bits of the game anyway.

So what's new? First up... this is one pretty game. And, impressively, even at this stage of development, it's running very smooth, both in terms of load times and frame rates. Even pumping every setting up to max, from AA to unit size to texture detail didn't cause our ASUS 5970-powered system to falter.

In-game, the strategic overview map has gotten a much more stylised facelift – rather than present the subdued environment of previous games, the mountains, rivers and forests of Shogun 2 have a decidedly artistic look, like woodcuts from the period. At the same time, it also gets across a lot more information on the ground you'll be fighting over, from tree density to the lay of the land. Fog of War is simulated by a lovely parchment effect, the real terrain opening up as you explore and trade.

It's also here that you'll build and maintain your economy, and it's as fully realised as Empire was before it, including the ability to head to the seas and open up trade routes. Buildings can be upgraded to produce new units or increase your wealth – it's quite clearly laid out, and there's always an advisor to help you out if you need some advice on what to build next. However,

money in infinite supply is merely the sinew of war, to dreadfully paraphrase Marcus Tullius Cicero. The real thing happens on the tactical map, and again, it is a thing of beauty.

## Ray of light

Is it too early to be calling Shogun 2's lighting engine the best of 2011? If it is, we don't care – that first moment you drop into the tactical map in the campaign tutorial is stunning. It's a fire-blasted battlefield, with sheets of flaming arrows skirling between the lines, and a murky sun setting through the smoke and ruin. In fact, it's the kind of scene that inspires hack fantasy writing – and we mean that in a good way! And that's before you take in the unit detail.

Shogun, in its original incarnation, featured 2D sprites on a 3D battlefield. This is about as far as you can get from that tech as match-grade modern firearm is from a primitive spear. There's a wider range of variance amongst individual soldiers than ever before, and the textures on each are stunning – seriously, it's the kind of detail you'd expect from Crysis, not a game that's capable of putting up to 56,000 individuals on the field.

Which, incidentally, is a lot of troops – more

than any other game in the series. Hell, more than any other wargame *period*. And they each cast a detailed shadow, each mesh in with their opponents to create the most believable sensation of a fighting melee.

What's even more impressive is the improved pathfinding, and the greater terrain detail that provides for. In one clash, there was a high promontory with two twisting paths leading up to it – in pretty much any other Total War game this would be a recipe for disaster, but not only did our units fit on the oddly shaped hilltop, but they were able to easily find the best path down with just one click. And without leaving stragglers stuck on random textures.

## Come on March!

For all the ways that Shogun 2 is a literal step backwards, in terms of its technical prowess it's anything but. Every trick, mechanic and detail learned over ten years of game production has been further honed to produce what we're confident will be the greatest game of the series.

And, finally, a game worthy of a fascinating and tumultuous period of history. **DH**



PC

Developer: The Creative Assembly  
Publisher: Sega  
Website: [www.totalwar.com/shogun2](http://www.totalwar.com/shogun2)



Vastly improved AI, gorgeous art direction, incredible detail.



We're running out of high scores.

### Anticipation rating

If we didn't think they'd make a liar of us with the next game, we'd call this the defining title.

**89%**





Not strictly an RPG, but very shiny and British. What's not to like?

If there was a word I'd shellac to Fable III, I'd be hard pressed to choose between 'shiny' and 'fun'. This isn't a serious RPG-style game, and it doesn't pretend to be; we stopped thinking of Fable as an RPG after II came out. The later instalments seem to be the bastard children of an action adventure game and The Sims. Don't let that put you off, though. This is actually quite enjoyable!

Considering the monumental leap from Fable to Fable II a couple of years ago, you could be forgiven for having high expectations of Fable III. To my mind, III is what II should have been. Graphically it's more refined, with smoother gameplay, a few interesting innovations, some great scripting and some lovely emotional interactions.

The main quest will probably rack up about 15-20 hours of game time, with a few side quests thrown in, not including all the mischief you can get up to after you become Supreme Overlord High Poobar... ahem, King or Queen.

## Many years later...

Set 50 years after Fable II, you are the progeny of the last ruler of Albion, the Hero from Fable II. Albion is now ruled by your big bro, and he's got crankypants (you can tell by his evil facial hair), and forces you to flee Bowerstone with your mentor, Sir Walter, and your servant, Jasper. Then, donning your trusty beret, you set out to stir the unwashed masses into Revolution!

(Sadly, you don't get a Guevara style beret. Must send note to Molyneux.)

Basic gameplay hasn't changed much. You go on quests, you fight brigands and monsters,

ferret out hidden items and make yourself either a nuisance or a boon to the people of Albion, with your trusty dog by your side.

Combat has been simplified and few of the enemies pose any real threat to you. It's quite easy to get through the game without even being knocked out. Flourishes have had a rather dashing makeover, however. Fable II flourishes usually involved a bit of fancy sword work, whereas Fable III flourishes really make the combat. They run the gammut of fancy swordwork to impressive pistoleering, and occasionally some lethal acrobatics.

You start with weapons that evolve based on how you play. For example, do you like to kick a lot of chickens? Your blade may become twisted

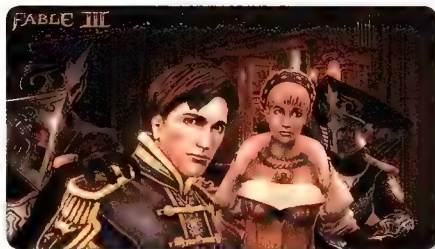
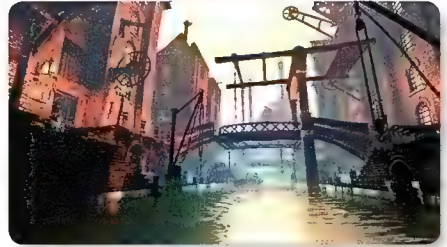
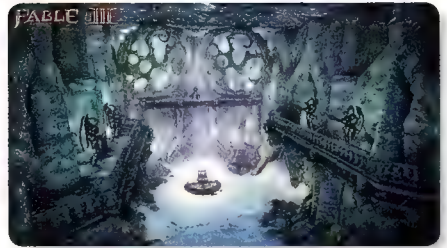


and cruel. There are other weapons to buy/find and use, and each has advantages that can be built upon.

Magical gauntlets are the latest fashion, allowing you to combine spells. To top everything off, there's your wardrobe of course. Yes, you







can indeed run around in a chicken suit smiting the undead and should-be-dead if you desire.

map and point. But, you can now also buy real estate and upkeep your holdings from the same spot. There are even little people wandering around on it. Tres cute.

If you take the RPG abilities and skills menu and simplify the cahones out of it, you'll end up with the Road to Rule. As you earn 'guild seals' you get to spend them on opening chests alongside the road, to upgrade your abilities or buy new ones. Each time you complete a major plot point, another gate along the road opens, and more chests are available. It's XP by any other name.

## Pretty, pretty

The graphics of Fable now define it. The distinctive style captured in Fable II is carried through Fable III and refined, with a more pronounced lean towards Steampunk. It lends continuity to the game and a certain sense of nostalgia for those who enjoyed the aesthetic of Fable II. It was pretty then, but now it's gorgeous. Areas like Bowerstone Industrial, Aurora, The Reliquary under Brightwall Academy and The Road to Rule are stunning, to name but a few. Combat graphics, especially Flourishes, are also beautifully executed with no lag, and the

physiology of main characters is well realised and unique.

It's not quite perfect. Frequently you're digging up treasure *through* your dog (when he hasn't blended into the background or gone missing altogether), or getting a touch of vertigo over a wonky animation, and there are a few frame rate issues. But overall, we're pretty happy with the graphics; the flaws are only so glaring because everything else is so damn shiny.

The time put into scripting, the inclusion of a meta-world, and the voice talent top this off. The dialogue frequently has non-gaming bystanders in fits of laughter as they wander past, and we were unable to complete a certain D&D inspired mini quest in a timely fashion due to giggle paralysis. It's all incredibly British, and just so randomly quirky that it's hard not to find it endearing. Zoe Wanamaker returns as Therese, as Stephen Fry reprises Reaver (not aged a day of course). Simon Pegg, Ben Kingsley, Bernard Hill and the indomitable John Cleese as Jasper round out a fantastic cast, and even lend a little influence to the look of their characters.

Fable III: so damn shiny, and a rollicking good time! **CW**

## Your home away from home

There are no longer any large, clunky menus to be seen. Instead, the Sanctuary is its own little interactive I-can't-believe-its-not-a-menu inhabited by Jasper, who will tell you when there is new information to hand, and offers 'helpful' comments on your wardrobe and armoury.

The Sanctuary also contains two other important mechanics: The World Map and The Road to Rule.

The World Map functions the same as in Fable II. You want to get somewhere, you go to the



Xbox 360

Developer Lionhead Studios

Publisher Microsoft

Website <http://lionhead.com/Fable/FableIII/>

### Gameplay

Simplified and generally smooth, will lack challenge for core gamers.

75

### Graphics

Visually sumptuous, still has some bugs to be worked out.

80

### Sound

Great attention to detail, the singing chickens steal the show.

85

### Overall

A really good looking, fun game that doesn't take itself too seriously.

80%



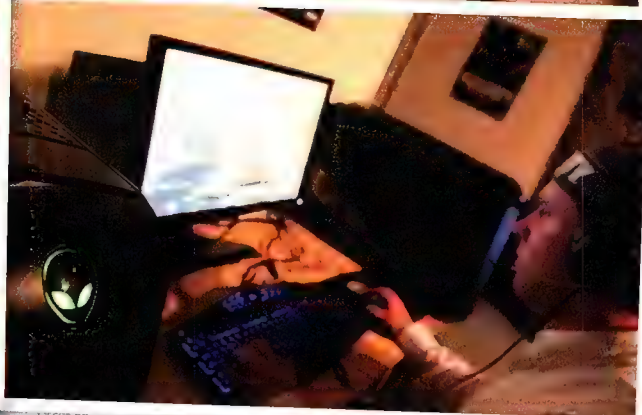


All the action and entertainment at Atomic's last HQ event of the year a Black Ops LAN of especial magnificence!

**G**uns, pizza, beer.

It's a magical combination, made even more so when it's the guns of the hot new Call of Duty: Black Ops, the pizza is free, and beer can be supped while hanging out fellow Atomicans at our new Alienware LAN setup. If that's not a recipe for a perfect night of fun, I don't know what is.

But that's exactly what transpired at Atomic HQ last night. We hosted 24 elite Atomicans who were champing at the bit to get at each other in 4v4 LAN setup. We had eight hot Alienware systems ready to accommodate them, and smokin' ASUS-powered



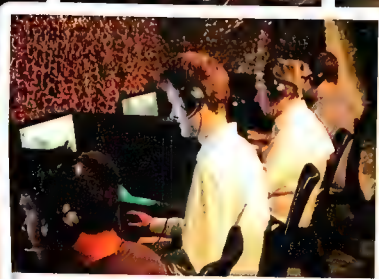




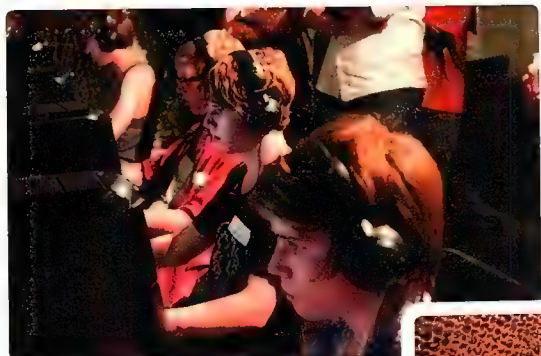
3D rig to show off the full impact of the Black Ops campaign in all three dimensions.

Guests were split into six teams - Kennedy, Carter, Nixon, Castro, Johnson and Kruschev - of four players each. The first round saw each team facing off over a Capture the Flag mode on perfectly sized Firing Range map.


The best of the three teams went straight through into the finals, and the next two teams played off for the privilege of taking them on. From the final round, one team emerged victorious - Team Carter, displaying uncanny skill and teamwork! ►







Then we split them up for a Hardcore Free For All to determine the final winner, who walked away with the Special Edition of Black Ops, complete with remote control car! And every one of them got a copy of the game on PC, thanks to sponsor Activision.


What a night - huge fun, a huger bodycount, and great peeps to hang with. Thanks to Activision for the game and prizes, thanks to Alienware for the systems, and thanks to all the Atomicans for coming along. 



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# #1 PC

**Ben Mansill and the time & space physics of why precious life-items are lost forever. Or are they?**

**M**ost normal people accumulate stuff. They keep things well past any feasible use-by date. They tuck them away, pack things in boxes in the garage, shove stuff under the bed, on top of cupboards. Usually the only tangible win in the whole process is the evolving cleverness it takes to actually store a thing for which the storage vessel has not got the space.

Years pass. House moving is the only intervention between man and stored thing, then only for a fleeting moment of consideration, the thought process being: "Aw, I remember when I used to use [thing] all the time. When I was younger. That means I'm old now. Would it be best to chuck it, garage sale it or ebay it?"

You can't do that with PCs. In space and time terms, a PC is a wobbling nebula of new components constantly coming into being, recreating and redefining the whole each time. Ergo: there is no PC.

In a bit more than 20 years of owning 'a PC',

**Freezing PC time is at best a fuzzy snapshot of a box just a month past its last upgrade, and a couple of months before its next one.**

I'm pretty sure I've only been through 5 or 6 cases. Inside the bits were upgraded several times a year. So while there were long lasting CPUs, it's impossible to say "well that was my Athlon PC", as it would have seen at least a couple of RAM upgrades, an OS or two, and half a dozen graphics cards.

That's why there aren't 20 PCs stored in the garage. That's why no PC will ever, anywhere in the world, be mothballed. A PC starting to slip outside expected performance parameters can either be upgraded, gifted as a homework machine to a mate's kid, or chucked out. Linux people are different, once their main workhorse CPU is ten years old they'll put it out to pasture as a server. But that's different, because they're Linux people.

This is also why I can't put my finger on my 'favourite old PC'. If I could actually remember the exact configuration of, say, the PC I first played Quake on, then that'd be a special one. But alas, freezing PC time is at best a fuzzy snapshot of a box just a month past its last upgrade, and a couple of months before its next one.

There is, however, one PC that stands apart from the universal law of PC shape-shifting, and forever will remain a precisely defined box of both components and memories. Locked in

time for eternity, etched in my memory like a carbonited Han Solo, except smiling.

My very first PC.

One True Love entered my life as a 386DX/25 with 2MB of RAM, Tseng Labs ET4000 graphics, an Adlib sound card (with a volume knob on the back panel) and running MS DOS 3.3. Within months it would sport a Sound Blaster and the plug-in maths co-processor (because I found out they existed, and Falcon 3.0's High Fidelity mode needed it).

It lived in my first dedicated computer room, the little room at the end of the hallway dubbed 'Far Canal'. That was important; pre-PC my Amiga 500 lived in my bedroom, and there are thousands of reasons why you shouldn't have your computer in your bedroom.

It was a clone box, bought from a Chinese-run shop up the road where box-lined walls and product posters enticed in equal measures to the push-away effect of the staff's attitude to customers. It's important to the integrity of this story to ignore the fact that PC#1 was actually upgraded for the first time on the very day I bought it, but who cares about that. Arriving home in the morning I installed (my PC owning friend would always say "programmed in" instead of "installing"...) my first PC game: Command

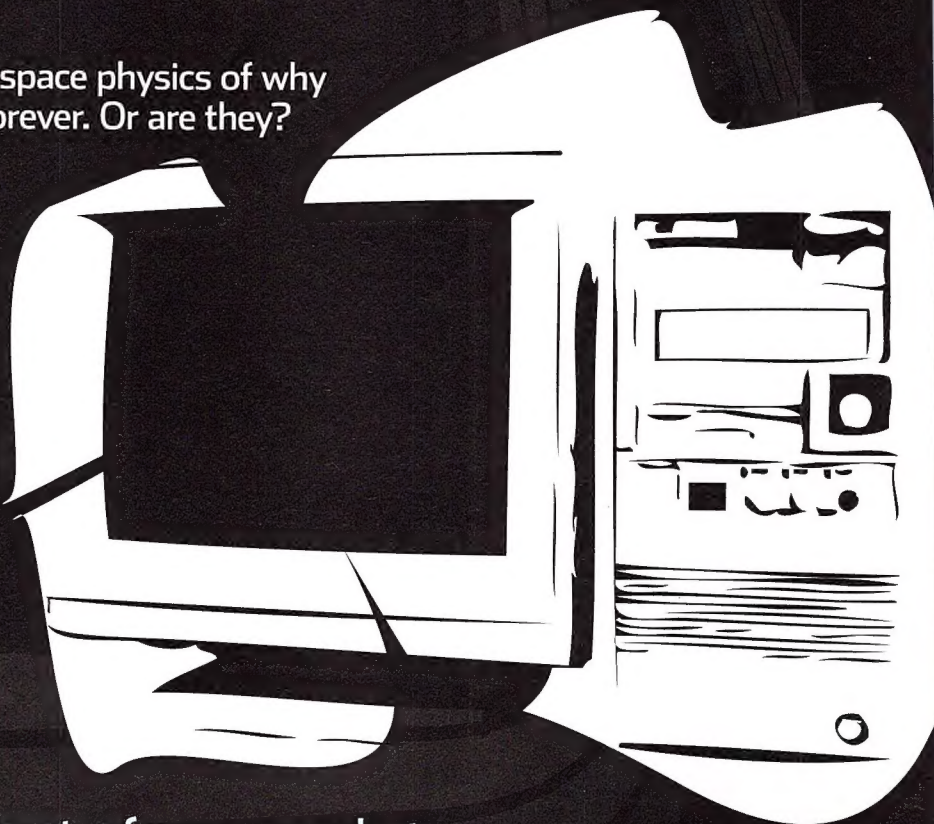
HQ, a nice little global war strategy thing. The mouse didn't work, so I'm straight back up there demanding a new one. The guy takes the PC out the back and returns a few minutes later with a working mouse. But it's the same mouse. He'd upped the RAM from 1MB to 2MB and that fixed it. To this day I wonder how the heck a system memory upgrade can fix a non-functioning mouse, or that he knew to try it.

To the point: I want to play with my first PC. Right. Now. I want to touch the power button and feel the thrum as the power supply blurts to life, I want to hear its annoying too-loud thrum. I want to watch the POST stuff, see my precisely tailored config.sys and autoexec.bat load the DOS magic. I want to stare at a black screen, C:\>\_ top left.

I want to play the old games I had installed, firing them up with my little .BAT files I'd 'programmed in' ('A' for Aces of the Pacific, 'WC' for Wing Commander, 'L' for Lemmings...).

Such retro re-living of the past is possible with old consoles, if you kept them. Alas, as with everything I've chucked out but should have kept, #1 PC is gone forever.

Or is it? Given that I've never bought a complete PC since that day, the ongoing upgrade cycle establishes a direct connection between the PC I'm writing this on, and #1. The degrees of separation are well more than six, but the lineage is there, a scissor cut out string of paper men holding hands, with the last guy on the row my Intel SSD, and the first guy the whole #1 box. (5)





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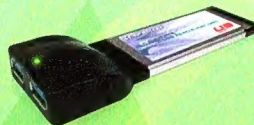
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